# COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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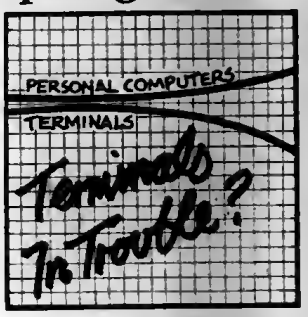
## Industry Spotlight

## inals Feeling Pinch Of Micro Mart




By Ed Scannell
CW Staff

From the time that microcomputers were just board-level products fresh out of the garages of whiz-kid entrepreneurs, people have been saying that they would someday replace the terminals used by executives and their clerical staffs.

But five and a half years after Apple Computer, Inc., Tandy Corp.'s Radio Shack and Commodore Business Machines, Inc. delivered their first turnkey systems, terminals continue to be an integral part of both large and small corporations' distributed data processing systems.

Terminal manufacturers are, therefore, far from ready to be placed on the list of endangered species. But their lives have been made increasingly difficult by the quantum leaps in price/performance accomplished by microcomputer manufacturers, as well as by the eroding profit margins caused by low-cost terminals made in the Far East over the last two years. And some industry watchers predict that their lives will not get any easier.

Terminal manufacturers that want to extract themselves from the pincers formed by foreign terminal manufacturers with $600-and-under products at one end and microcomputer vendors with sophisticated but inexpensive products on the other end find themselves in a quandary.

If they decide to get into the microcomputer business, they will be moving from one very competitive market to an even more competitive one where they will have to wrest market share away from cash-rich companies like IBM, Digital Equipment Corp. and Apple.

If they decide to take on the Far East terminal makers, they will have to compete — probably futilely — against companies that benefit from

(Continued on Page 14)

# Fortune-Type Firms Shopping for Micros In Retail Stores: Study

By Bill Laberis
CW Staff

SYKESVILLE, Md. — In a "decided shift" in buying patterns, more and more Fortune-type corporations are going shopping in retail computer stores for microcomputers.

Furthermore, the increasing role that established DP departments are playing in micro policy planning is resulting in more large corporations buying their micros from "traditional suppliers of information processing equipment."

Of those "traditional suppliers," IBM and Digital Equipment Corp. will top the market.

These are some of the findings contained in the report on "Microcomputer Usage Trends in Fortune Corporations" recently released by Newton-Evans Research Co. here. The study was based on replies to questionnaires from top-level DP executives in 124 Fortune 1,300 companies. Information was gathered from January through March of this year.

The study results confirmed the generally accepted notion that microcomputer installations will boom in the corporate environment. The number of installed micros per corporation will increase by a compounded 5% per month through 1983, or nearly 70% on an annualized basis, the report projected.

This means that by the end of 1984, an average of 166 micros will be installed in a typical large corporation, compared with about 70 now.

However, it is not the anticipated

(Continued on Page 6)

# IBM Unwraps Low-End, VLSI-Based 8100

By Ed Scannell
CW Staff

RYE BROOK, N.Y. — IBM extended its 8100 line of distributed processing systems last week by unwrapping a low-end processor based on very large-scale integration technology. The 8130B processor, available in two versions, is 50% faster and stores twice as much information as the 8130A, the previous low-end 8100 machine, IBM said.

The 8130A, which will not be replaced by the new machine, can be upgraded to an 8130B for $1,700.

Besides unveiling the 8130B, IBM also took the wraps off a new Series/1 system, called the Model 30D, that it said is four times smaller and 15% to 20% less expensive than previous models (story on Page 4). It features an integrated 30M-byte disk and an optional 1.2M-byte diskette.

In other moves last week, IBM also:

- Announced the Distributed Processing Programming Executive/System Product, which is compatible with the company's DPPX operating system and reportedly makes it easier for users to implement and manage 8100s in a distributed data processing network. The program also makes it possible for the 8100 to support more workstations, including the recently announced 3178 and 3290 display stations and the 3270 Personal Computer Attachment feature.
- Released a version of the Distributed Office Support Facility program that will allow documents to be exchanged between 8100s and the Displaywriter. The updated DOSF

(Continued on Page 4)

## SPECIAL REPORT

**Inside —**
**Software Productivity Packages: Stretching Your DP Resources**

*Repeal Believed Inevitable*

# Withholding on Ice Until Aug. 1

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The Reagan administration has delayed until Aug. 1 the implementation date of the Tax Equity and Fiscal Reform Act provision requiring financial institutions and corporations to withhold 10% of interest and dividend payments.

The administration's move has been interpreted as recognition that congressional repeal of the controversial withholding provision is inevitable.

Treasury Secretary Donald Regan granted the one-month delay, which was requested by members of both houses of Congress [CW, June 20], in return for Senate approval of repeal legislation that institutes stronger enforcement measures for existing withholding requirements. That bill passed the Senate June 16 on an 86-41 vote.

### House-Senate Action

The Senate bill must now be reconciled with straight withholding repeal legislation passed previously by the House of Representatives. Attempts to pass a straight repeal bill in the Senate failed as Senate Finance Committee Chairman Robert Dole (R-Kan.) pushed through the amended legislation in return for White House support for repeal plus stepped-up enforcement and penalties for those caught violating existing withholding requirements.

With this latest move, eventual repeal of Tefra's 10% withholding provision is believed assured.

The actual date of repeal, however, depends on an ad hoc House-Senate conference committee that must settle differences between their respective bills. The Aug. 1 implementation date removes the pressure on the committee to come up with a compromise bill acceptable to both chambers of Congress.

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# More States Eyeing CRT Measures

By Marguerite Zientara
CW Staff

AUGUSTA, Maine — The Maine legislature recently ordered the Maine Bureau of Labor Standards to conduct a two-year study of whether there should be controls over the use of CRTs in public jobs.

Meanwhile, in Oregon, opposition from the business community has reduced the requirements of a CRT health safety bill introduced in the Oregon legislature last March.

Connecticut, Illinois, Massachusetts [CW, May 2] and New York are also presently considering CRT safety legislation.

The Maine legislature passed a statutory resolve directing the state Bureau of Labor Standards to collect and store all data centrally, to make that data available to employers and workers and to study and review all the data. In addition, the bureau may promulgate rules without legislative approval.

"This is the first time in the nation there has been statutory action and concern for the problems of workers," noted the bill's sponsor, Rep. Edith Beaulieu (D-Portland). "Maybe this will be a signal to all the states to get their acts together."

In Oregon, the original CRT health safety bill set working conditions by statute. Sponsored by Sen. Margie Hendriksen (D-Eugene), S.B. 568 included requirements that office lighting minimize screen glare for operators and that machines be at least four feet from office heat exhaust to lessen eye discomfort.

### Original Requirements

The original bill also mandated semiannual maintenance and radiation checks on machines and free annual eye examinations for operators. It stated that no operator should be required to work more than two consecutive hours at a terminal without at least a half hour of work away from the terminal and that no operator work at a CRT 30 minutes before the end of the workday.

In response to lobbying and complaints in public hearings about the cost to retrofit offices to meet the bill's requirements, its requirements have been softened, first of all, by using the vehicle of "administrative rules" instead of "statutes."

The bill now instructs the state's Workers' Compensation Department to adopt "rules" minimizing operator eye strain and exposure to excessive heat near CRTs. The modified bill would still require semiannual machine checks and annual eye exams, but it would apply only to operators working four or more hours with a CRT.

# Commerce: Updated Cobol Could Net Feds $72 Million

WASHINGTON, D.C. — The federal government will net an estimated $72 million in benefits if a proposed revision to Cobol is adopted, according to a study published by the Commerce Department's National Bureau of Standards.

The study estimates that it will cost the government approximately $18 million to convert old Cobol programs to the new standard, but that savings would total $90 million over the next 10 years. The study concludes that in most cases, the benefits of implementing the new standard would outweigh the costs to both government and private industry.

The study analyzed over 1,000 Cobol programs and more than one million lines of code from 11 federal agencies and interviewed Cobol users from nine agencies.

The study, called "Cost-Benefit Impact Study on the Adoption of the Draft Proposed Revised X3.23 American National Standard Programming Language Cobol" (NBSIR 83-2639), is available for $11.50 from the National Technical Information Service, Springfield, Va. 22161.

## *Comments on Cobol-8X Solicited*

WASHINGTON, D.C. — The call is out for interested DP professionals to review and comment on the newly updated Cobol-8X proposed standard (Dpans Cobol) during its four-month review period that began on June 10.

A printed copy of Dpans Cobol can be obtained by sending $25 to X3 Secretariat, Computer and Business Equipment Manufacturers (Cbema), Suite 500, 311 First St. N.W., Washington, D.C. 20001.

Comments on Dpans Cobol should be sent to Linda Willis, Chairwoman, X3J4, Cbema, Suite 500, 311 First St. N.W., Washington, D.C. 20001.

# This Week

# TRIPLE CROWN

## Introducing Sort Racing's Colt of the Year! (SyncSort DOS, Release 1.6.)

## Call (201) 568-9700.

## What you save ain't hay.

Hello, sort-racing fans! We bring you this report direct from the main clubhouse here at historic old SyncSort Farms, which has been called "the birthplace of sorting champions."

**That glossy young colt you see kicking up its heels out there in the main paddock is the latest in a long line of SyncSort Triple-Crown winners. It's SyncSort DOS, Release 1.6. And it's been causing a sensation around the world's DOS/VS(E) tracks.**

Here are some of the top honors it's already captured:

**(1) THE PERFORMANCE CROWN:** SyncSort DOS, Release 1.6 is a chip off a couple of good old blocks. Its daddy was High Technology, and its mommie was that celebrated brood mare State of the Art.

Like all its famous ancestors, Release 1.6 eats lightly of computer resources but moves very fast indeed. It's bred especially to provide dazzling performance on the 4300 series, with their Fixed Block Architecture and VSAM-type of data.

**Compared to that venerable old oat burner IBM's 5746-SM2, Release 1.6 can save you up to 50% in CPU Time and up to 70% in SIOs, as the charts below indicate.**

**(2) THE PRODUCTIVITY CROWN:** SyncSort DOS has always been a favorite with sort jockeys because it's so easy to handle. Advanced features reduce the time required for simple reports from five days to one.

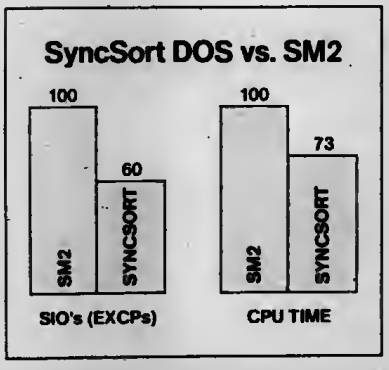
**Now Release 1.6 adds another popular new capability. The Sortwriter feature makes it possible to specify reports in virtually any format you require.**

With a single pass of the sort, Release 1.6 can manipulate data and present the output in a wide variety of formats — with headings, trailers, totaling and sub-totaling, dating, spacing, line-skipping, character insertion, and data-format conversion.

**(3) THE SERVICE CROWN:** One of the reasons that SyncSort has over 6,500 users all around the world, is that we look out for the people who use our products. Our Technical Service is fast, accurate and courteous. More than 85% of all customer inquiries are resolved within 24 hours.

If you'd like to see how SyncSort DOS, Release 1.6 performs on your turf, give us a call. We'll be glad to help you set up a little "sortstakes" that will match Release 1.6 against your present sort.

After that improving the breed of your sorts should be no trouble at all.

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# Embezzler Volunteers To Redesign Victim's System

By Marguerite Zientara
CW Staff

EASTON, Pa. — A computer operator who pleaded guilty to embezzling more than $84,000 from a state agency here has voluntarily helped the victimized department to redesign its computer security system.

Renee Godshalk, 23, a former employee of Northampton County's Domestic Relations Department, was charged March 17 with stealing about $10,000 since last September. Two weeks ago, the complaint was amended to reflect a two-year operation totaling more than $84,000.

Godshalk faces a maximum penalty of seven years in prison and/or a $15,000 fine for third-degree felony. She is free on bail until her sentencing in about two months.

At the time Godshalk pleaded guilty, county officials explained that she gave most of the money to her drug-dependent boyfriend and other drug-dependent friends.

Assistant District Attorney John Spirk Jr. said he was present when Godshalk "showed [the department] what she could do with the computer and what possible manipulations could be performed and possible illegal or unsavory things that could be done." Godshalk "was very adept at knowing what the computer could do — easily the most knowledgeable person in that whole office."

Godshalk's job included receiving cash and check payments of support money. In the case of a cash payment, normal procedure was for her to ring up the cash amount in the cash register, deliver a receipt and post into the computer, for example, John Doe's payment of $300 and the date on which he paid it.

"What she would do is ring up the money in the cash register, give the guy his receipt and then pocket the money some time later that day — actually remove the cash and stick it in her purse," Spirk explained. "Then, when she would go to the computer to post the money to Doe's account — which she had to do so that his beneficiaries would get paid — she would find an incoming check from some other client in the same amount and post that $300 check to Smith's account."

She would eventually "get somebody else's check for $300 and cover it to the first check she misapplied."

Why did it take the Domestic Relations Department two years to catch up with Godshalk? "A lot of people are asking that question," Spirk said. A spokesman from the department was not available for comment last week.

# Latest IBM Series/1 Sports 30M-Byte Integrated Disk

By Ed Scannell
CW Staff

RYE BROOK, N.Y. — IBM's latest addition to its Series/1 family of minicomputers is four times smaller than other family members and sports a 30M-byte integrated disk and an optional 1.2M-byte diskette.

A user that purchases the Series/1 Model 30D rather than a separate processor, disk, diskette and power system would end up with a system that is priced 15% to 20% less, costs between 9% and 29% less to maintain, weighs 38% less and requires 61% less power to operate, IBM claimed. The 3-ft, 14-in. unit can be rack-mounted in a Series/1 frame or be placed in a tabletop enclosure.

An optional 64K-byte cache memory for the system's disk storage device not only helps the system's overall performance, but minimizes physical disk access by storing frequently used information in its semiconductor memory, IBM said.

Depending on the application, the cache option doubles the disk throughput speed of the Series/1 compared with systems without the cache feature, a spokesman noted.

Besides the repackaged Series/1, IBM also unwrapped an optional storage card for the Series/1 Model 4956 system introduced earlier this year. The card supplies a basic system with 512K bytes of main storage that can be expanded to 1M byte by incorporating another card, the spokesman said.

Prices for the Model 30D start at $17,675 if the system is built around a 4952 processor and go up to $23,360 for the 4956. The optional 4965 storage and I/O device costs $13,500, the spokesman said.

Increasing the memory of the 4956 from 256K bytes to 512K bytes will cost users $2,500.

First customer deliveries of the Model 30D are slated for September from IBM's Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

# VLSI-Based Unit Becomes 8100 Low End

(Continued from Page 1)

also permits an 8100 to function as a departmental controller for multiple Displaywriters.

- Reduced prices on some 8100 equipment, including a 26% drop on the 8130A, a 23% cut on the 8140 and 11% off all 8101 storage and I/O devices.
- Announced volume purchase discounts of up to 35% for users purchasing 45 or more 8100 machines.

### First VLSI Processor for 8100

The 8130B introduced last week stores up to 2M bytes of information internally and, with the attachment of an additional 8101 storage unit, holds up to 451M bytes of data on disk — a 40% increase over the 8130A, IBM said.

The 8130B's CPU is the first VLSI-based processor used in an 8100 system, the company noted. The processor contains field-effect transistor logic chips that have up to 8,400 circuits per chip as well as a bipolar logic chip with 1,373 circuits.

This technology makes it possible for a single processor card to replace the nine cards that were needed before. A spokesman claimed the VLSI technology has also improved overall CPU reliability, thereby reducing maintenance costs.

The system's improved main storage capacity provides additional logical address space, permitting more shared programs to be stored in a system as well as improving the programming abilities of users running the DPPX operating system.

The 8130B is available in two versions: the Model B23 with 64M bytes of nonremovable disk storage and the B24 with 130K bytes of fixed-head and 58M bytes of nonremovable disk storage. A B23 configured with 1M byte of internal memory costs $37,600, while a similarly configured B24 costs $38,380. An additional 512K bytes of memory can be purchased for $5,000.

Leasing terms for the systems, which are available through the IBM Credit Corp., are $752/mo for the B23 and $768/mo for the B24.

The DPPX/SP program has a one-time charge of $19,600 and carries a monthly license fee of $760. A utility package compatible with DPPX/SP, called Interactive Map Definition, carries a one-time charge of $5,300 and can be licensed for $186/mo.

Release 4 of the DOSF program lists for $12,300 and can be licensed for $704/mo.

The 8130B is scheduled for delivery in February; first shipments of upgrades for the 8130A are slated for May. The DOSF package will not be available until February, but the DPPX program is slated for an October release by IBM's Information Systems Group, located at 900 King St., Rye Brook, N.Y. 10573.

## Latest 8100 First of Series?

SAN JOSE, Calif. — The very large-scale integration (VLSI)-based 8130B processor introduced by IBM last week may be only the first in a series of new engines that will be used to power future 8100 systems, according to Bill Ackerman, president of DPX, Inc. here. DPX publishes a monthly newsletter on the 8100.

"The development of an entirely new engine based on VLSI technology is far too expensive an effort for IBM simply to produce a system with the same kind of power as an 8140. This announcement can only mean this is the first of a new line of engines for 8100 customers," Ackerman speculated.

Ackerman does not think the healthy price cuts made on existing 8100 systems necessarily mean IBM is priming its customers for across-the-board sequels to its 8100 computers. But he does think the price cuts indicate IBM is responding "to the volumes and to the competition."

The DPPX/SP software announced last week is a significant announcement in the 8100 world because it gathers all the scattered DPPX software pieces into one neat bundle, Ackerman said. IBM has taken "an enhanced version of the operating system and bundled it in with 10 other program products."

*When Purchasing Hardware*

# DP Execs Finding IBM Deals Too Complex

By Tom Henkel
CW Staff

A majority of 10 DP executives polled recently by *Computerworld* agreed that the numerous lease and rental agreements, volume purchase deals and special contracts available from IBM are making it more difficult to decide which deal is best.

And it gets even more confusing when one factors in the deals offered by plog-compatible manufacturers (PCM), third-party dealers and lessors that are similar, but not identical, to IBM's deals..

The secret to getting a good deal, most DP executives said, is to determine exactly what hardware is needed and how long it will last, then call on the corporate financial and legal departments to help choose the best deal. But lawyers and accountants often do not have technical backgrounds, so their advice cannot always be taken as gospel, some of the respondents cautioned. The final decision should rest with the DP department.

While the task of choosing the best deal is more complex today, larger companies are doing what they have always done — developing financial groups within the DP department to analyze various hardware deals and pick the best one, noted James Cutro, senior vice-president for data processing at Crum & Forster Corp. in Morristown, N.J.

"It's just an extension of third-party shopping," an acquisition technique many large firms have used for years, Cutro said.

### Overwhelming Burden

While keeping track of the optiona can be a burden for large companies, it can be overwhelming for smaller firms. "It all got so complex" for one vice-president of management information systems (MIS), who asked not to be identified, that "we had to bring in financial people to talk with each other."

According to Harry Bock, vice-president for MIS at Chicago-based Florsheim Shoe Co., "It's getting hard to keep track of who's on first." While evaluating hardware deals is not a mystery, "it is not an area to get into lightly."

IBM, third-party dealers and PCMs are very competitive these days, and picking the best deal often means poring over mounds of paperwork, Bock observed.

For other small shops, however, the many leasing deals and volume discounts offered by IBM and its competitors have made hardware acquisition easy: If the company cannot afford to purchase the hardware, it lives without it.

Douglas H. Wyse, director of computer services for Darien, Conn.-based Zotos International, Inc., said leasing hardware is no longer practical for his firm. Instead, Zotos has adopted a policy of buying most of its hardware directly from IBM. If IBM cannot provide direct delivery in a reasonable time frame, Zotos tries to buy the hardware through a third party.

The ever-shorter life span of hardware is a bigger problem than acquisition, Wyse noted. Zotos once bought hardware with the expectation that it would last at least five years; now the hardware life span is getting closer to three years, Wyse said.

### Emphasis on Purchases

Echoing Wyse's statement that purchasing hardware is becoming more economical than leasing it, Philadelphia-based Penwalt Corp. is also putting a heavier emphasis on purchasing hardware, according to the firm's manager of systems and technical services, Gene Stiefel.

Stiefel said his firm tries to take advantage of volume purchase discounts whenever possible. "The purchasing decision is half financial and half technical. You must have experience in both," Stiefel said, noting that technically oriented DP professionals have to educate themselves with respect to the financial aspects of processor acquisition. "We have been acquiring our financial knowledge in the last several years. It's been happening over time."

Stiefel also noted that while financially oriented staff members of the company, such as the purchasing department, can be quite helpful, DP executives cannot rely on them to make financial decisions on hardware. In addition, he said, many non-technical people tend to shy away from offering advice on computer hardware deals because they just do not understand the technology.

Finally, John Brown, director of information systems at the Kansas Farm Bureau in Manhattan, Kan., noted that his organization has switched to leasing hardware through the IBM Credit Corp. "Unless we can see a fast payment on buying equipment, we don't purchase," Brown said, adding that he gets so many calls from leasing companies offering different deals that it has become confusing.

"Too many calls can waste time," Brown said.

# Airline Execs Say Reservations Systems Biased

By Paul Gillin
CW Staff

WASHINGTON, D.C. — Computerized reservstion systems marketed by the major sirlines unfairly favor those companies' flights at the expense of the carriers who do not have the automated systems, airline executives told a House of Representatives subcommittee last week.

The Public Works and Transportation Committee's Subcommittee on Aviation slso heard a statement signed by 16 carriers that expressed "serious concerns sbout the level of bias" in the reservation systems msrketed by the major carriers.

Largely at issue are United Airlines' Apollo and American Airlines' Sabre systems, which split about 80% of the automs ted reservation market. Both systems are weighted to emphasize flights offered by their developers, but include information on competitive schedules as well.

Critics charge that in presenting United and American flights in the most desirable light, Apollo snd Sabre unfairly hinder the competition.

"The problem is that the public does not know what algorithm is being used or what the criteria are, and therefore it's very difficult for the public to overcome this bias," said Clark H. Onstad, vice-president of governmental affairs for Continental Airlines, in an interview following his testimony. "Depending on whether they walk into a travel agent who has Apollo, Sabre or [TWA's] Pars, the results you will see are different, and the public doesn't understand that."

Onstad charged that if bias is not restrained in airline reservation systems, it could spread to other areas in which computerization is emerging. "We're not very far from the day when you will walk into a real estate office and they will flash a bunch of houses on the screen and you'll get all the information from that," he asid. "That can easily be biased in terms of whatever the goals [of the system vendor] are."

A spokesman for United Air Lines admitted that bias exists, but claimed that the procedures are within iegsl constraints. "Carriers such as Continental feel they should have a totaiiy unbiased system free of charge," said John Zeeman, United's vice-president of marketing. "In other words, we shouid invest the money, take the risks and they should get all the benefits. We shouldn't be penalized for having the foresight to put together a computerized reservation system."

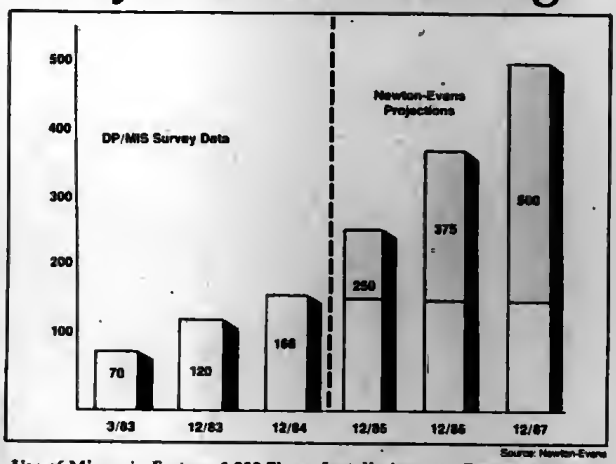
But Onstad claimed that United's and American's market penetration is so thorough that the carriers can afford to seii at a loss in anticipation of increased fare revenues, thereby undercutting any serious attempt at competition. "They don't price the hardware and software as a profit concept in itself," he said.

Onstad further charged that the two major airlines "have the ability to look into your proprietary data and make estimates and analysis, whereas we don't have it. We hsve tried to buy that data and they refused to sell it to us."

Zeeman termed the charge "ludicrous," adding, "There's s whole lot better information you'll get from sampling the travel agents than what you could get from the Apollo data."

The committee will probably present recommendations to the Civil Aeronautics Bosrd (CAB) later this summer, s staff member said. The Justice Department is also conducting an investigation into the allegations, and the CAB will probably begin to monitor the situation more closely, according to Dan McKinnon, chairman of the CAB.

# Study Probes Micro Usage




Use of Micros in Fortune 1,300 Firms: Installations per Corporate Entity

(Continued from Page 1)

growth in micro installations, but the means of procurement that Newton-Evans found most interesting. Asked what "real" channels of distribution they sre using to acquire micros, 53% of those surveyed cited retail computer stores. Only 23% named vendor representatives or vendor-owned stores ss the primsry distribution channei.

"Retail computer stores . . . were s particularly appealing channel to the financial services and insurance group of respondents, receiving two-thirds of that group," the report stated.

Other study findings bode well for the traditional large-system suppliers, some of whom presently have few microcomputer offerings. According to the report, IBM and DEC will eclipse micro makers Apple Computer, Inc. and Tandy Corp. in sales to the lucrative corporate market, mainly because of the input of DP departments in developing in-house micro policies. These policies, the study maintained, are stressing the integration of micros into existing mainframe environments, an area where IBM and DEC are clearly leaders.

Micro offerings from Hewlett-Packard Co. and s yet-to-be-announced offering from AT&T's American Bell, Inc. were also rated as contenders in the corporate micro arena.

The study found that the haphazsrd micro acquisition patterns that have characterized some micro purchases in the past are coming to an abrupt halt, replaced by documented planning. Three-quarters of the respondents indicated they either have or are planning a corporate micro acquisition policy.

Moreover, 90% of the respondents noted thst their DP organization either has or will have s role in the planning for micro acquisitions, the report continued.

Other findings in the study include:

- The professional worker in end-user departments is likely to account for over half the microcomputer use in large corporate environments, with managers and executives accounting for sn additional quarter of micro users and clerical and administrative staff comprising the remainder.
- DP executives regard finance as the department in greatest need of micros, followed by accounting and marketing.
- The "provision of network interfaces" is what executives see as the DP department's most important role in the microcomputer era.
- Two-thirds of the respondents regard the DP department as at least partially responsible for scquisition and development of micro software. More than half feel the end user has to be involved in the process.
- Privacy and security considerstions were the most oft-cited concerns expressed regarding the proliferation of microcomputing in the corporate environment.

"Microcomputer Uasge Trends in Fortune Corporations" is priced st $595 from Newton-Evans Resesrch, 13382 Grinstead Court, Sykesville, Md. 21784.

## *'We All Must Work Together'*

# Exec: BOCs Won't Adopt Proprietary Standards

By Phil Hirsch
CW Washington Bureau

BOSTON — The fear that the Bell operating companies (BOC) will develop proprietary network interfaces to discourage their business customers from migrating to other services is groundless.

That word came last week from R. J. Marano, chief executive of the Central Staff Organization, which the operating companies are establishing to perform a number of technical and marketing support functions — including the development of new net interfaces — when they are divested from AT&T. Marano was a featured speaker at the International Conference on Communications, sponsored by the Institute of Electrical and Electronics Engineers.

"I do not believe the preparation of standards is a unilateral process," Marano said. "All of us — local telephone companies, [the] Bell system and independents, along with interexchange carriers and vendors — must work together to establish standards for equipment and services." Efforts are under way to organize an exchange carriers standards association encompassing all of those groups, Marano said in a press conference held before his talk.

Asked whether his statement about network interface standards applied to the electrical and logical as well as to the physical interface level, Marano said he could not give a categorical answer because "I'm not a technician."

Turning to the Central Staff Organization, Marano acknowledged its criticism by AT&T's competitors who say it will enable the Long Lines Division and the other undivested parts of the Bell system to retain their special relationship with the Bell operating companies after divestiture. More than 80% of the Central Staff Organization's personnel will come from AT&T, the critics pointed out.

Marano insisted the critics' conclusion is wrong. One major Central Staff Organization function, he explained, will be to develop technical requirements for terminal, switching and transmission equipment needed by the operating companies; subsequently, the Central Staff Organization will evaluate vendor bids against these requirements. But in neither case will the Central Staff Organization favor AT&T, he said.

The technical requirements "will be stated in a generic way so that every vendor can manufacture [and market] a product to the [Bell operating companies]." Furthermore, "we will not put any 'seal of approval' on products or services." Instead, the Central Staff Organization will "objectively report the results of our technical analyses to the [Bell operating companies]."

This same point was touched on at the press conference preceding Marano's speech, when Marano said Long Lines, Bell Laboratories and Western Electric would be treated the same as all other nonaffiliated companies.

However, he immediately amended this statement by pointing out that the Modified Final Judgment — the proposed settlement of the U.S. vs. AT&T antitrust suit — requires Bell Labs and Western Electric to give the divested operating companies special service. For five years after divestiture, each AT&T affiliate must defer work for other customers, if necessary, to fulfill orders received from the divested operating companies.

Planning new network services and studying new technologies will be two of the Central Staff Organization's other functions, Marano said. Besides voice applications, he indicated the organization plans to concentrate on remote telemetry, text display, video and other broadband offerings.

## *Phone Numbers For Individuals?*

BOSTON — Assigning telephone numbers to people instead of places is one likely result of the onward march of telecommunications technology, in the opinion of Charles A. May, research director for the British Telecom, who spoke here last week at the International Conference on Communications.

May said there is a growing need to free the business user from "the tyranny of the local line." A pocket telephone connected to a mobile radio network is the answer, he suggested. The telephone, besides providing voice communications, would also supply an interface for a data terminal equipped with a display screen that could fit into a briefcase.

Widespread use of such terminals probably will make it necessary to give everyone a unique phone number, May said. That might raise alarms about personal privacy, he admitted, but he said the solution to this problem lies in giving everyone the capability to screen and reject incoming calls.

# Expanding Again, Insurer's DP Group Makes

By Paul Gillin
CW Staff

HARTFORD, Conn. — The Information Management Systems Division of the Hartford Insurance Group is expanding again. Having filled out the nine floors of its office building here with two data centers, the division is spilling over into Simsbury, Conn., where it will establish a third data center.

Despite the recession, the division has been expanding at the rate of 25% per year for the last five years. About 1,800 people work in DP at the Hartford, 950 in programming alone. DP's two data centers use 10 IBM 30 series mainframes, five IBM 4300 series minicomputers and an Amdahl Corp. 470V/6.

CW Photos by P. Gillin

**Programmer productivity is a commandment rather than a watchword at the Hartford, said Jack Crawford, assistant vice-president of information management systems.**

While programmer productivity is a watchword at most DP sites, it's a commandment at the Hartford, according to Jack Crawford, assistant vice-president of information management systems. With the support of top management, the division three years ago embarked on an extensive effort to upgrade programmer productivity.

About 20 man-years of planning was devoted to the effort before a nickel of savings was realized, Crawford said. But the plan that was formulated is now saving the company about 100 man-years of programming time annually.

The detailed plan focuses on three major areas of improvement: use of a high-level language as an alternative to Cobol; a project to employ reusable code to streamline programming and analysis; and a standardized testing method with a variety of software tools and an inspection procedure that lends a teamwork aspect to applications development.

Pivotal to the productivity effort is a nine-member resource center, which administers parts of the productivity effort and acts as a wellspring of information in the use of productivity tools. The center offers a reference center with copies of DP periodicals, policies and manuals; staff specialists in the various tools used by the department; a hot line; and staffers who coordinate DP offerings in the company's expansive education plan and provide feedback to vendors.

A separate group answers technical problems, and still another department evaluates new products and prepares them to be brought into the resource center.

The ongoing support aspect "allows us to continue to develop productivity tools and processes because we have that full-time commitment rather than a one-time effort," said Director of Data Processing Systems Marcia Tingley, who heads up the productivity support program.

The Hartford selected Information Builders, Inc.'s Focus as its fourth-generation language after evaluating it against 11 competitors. Installed in 1981, "Focus is used extensively for building decision support systems, report generation and "what-if" type of analysis and for prototyping of certain kinds of applications," according to Bill Baldwin, assistant director of information management systems and head of the resource center. Programmers "are able to react to the user-friendliness in a quicker manner," and Focus has elicited "very favorable" reactions from programmers who were initially skeptical, Baldwin said.

In mid-1981, the department began a project to improve its use of reusable code. "When you're in a smaller shop, it's customary for programmers to share a good routine or a ready-written program," Crawford said. "When you have 950 people, that kind of informal sharing doesn't work any more."

The Hartford project will document reusable code already in use in the department and establish indexes

## *Systems Development an Ironic Process*

HARTFORD, Conn. — The irony of systems development is that it is a strikingly manual process in a highly automated environment, DP management at the Hartford Insurance Group agreed.

Despite the widespread use of sophisticated text processing and graphics tools in the office, systems programming still relies heavily on documents and flowcharts created by pencil on paper. But in an environment like the Hartford Group's, in which "the project life cycle has specific end documents that need to be produced, you can automate procedures to produce them," according to Marcia Tingley, assistant secretary and director of DP systems.

Two years ago the company initiated the Developer Workstation project, a drive to build "a workstation for everybody in the department as well as for the user community so that documentation and system specs are transmitted electronically and our whole production release procedure can be done electronically," recalled Jack Crawford, a Hartford assistant vice-president of information management systems.

Now in the development stage, the Developer Workstation will eventually offer standard office automation functions like word processing and graphics along with project management and spreadsheet software, according to Bob Ramette, assistant systems manager of the systems development support center within data processing systems.

Graphics will focus heavily on flowcharting capabilities in order to automate a process "that's still done largely with templates and pencils," Tingley said. In addition, the microprocessor-based workstation will eventually include access to a data dictionary, menu and screen design tools in support of prototyping methods and an interface to existing testing resources with no initial downloading of testing functions.

Eventually the workstation will allow programmers to program directly from the terminal, Ramette added. "Right now to get [IBM's] TSO, CMS and graphics, you have to go from chair to chair and screen to screen," he said. "We want you to be able to access all this through the same terminal."

To accomplish that, the workstation, which has not been selected yet, will emulate an IBM 3270 or 3780 terminal and offer access to development systems for Cobol programming and testing. A second release of the workstation will also feature some built-in reusable code.

"Our aim is also to give the kind of workstation in which you can generate code from design documents," said Anna Thompson, a technical analyst. "In a few years, every programmer, systems analyst, manager and project director in systems programming will have access to one."

The Developer Workstation will not be cheap, with an estimated cost of about $20,000 per person. But by 1987, the department expects the tools to pay off with productivity increases in the range of 100%. "We're banking an awful lot on the Developer Workstation," Crawford said.

## *Programmers Huddle to Improve Productivity*

HARTFORD, Conn. — Teamwork does not apply just to sports and manufacturing, as the Hartford Insurance Group's Information Management Systems Division recently found.

As part of a corporatewide program to improve programmer productivity in the testing area, the company started a system of "inspections" — formal structured walkthroughs — which involve a programmer's peers in the design, coding and testing process of an application program.

Inspections are conducted on each program that takes two or more man-months to complete. Meetings include at least three people but can involve more. The team reads through the program looking for procedures that can be expressed more effectively. "If they find something, they talk about it and decide whether it's worth an enhancement," said Beverly Warner of the Resource Center within the Systems Support Division. "Management is not made aware of the topics discussed."

Although not fully implemented, the inspection system has already won praise from some programmers. "We're gung-ho on it," said programmer Carolyn McNamara Sluis. "It's no longer a thing of 'my little program.' Pride of authorship is replaced by teamwork."

"We all do things differently and this is a good way to find out a lot of routines that you can turn around and use in your own work," said programmer Christopher Caulfield, who added that inspections have improved his programming ability "tremendously." Pride of authorship is not affected because "you can still create a routine that can be used elsewhere."

"The programs all look standard, which makes them easier to maintain and easier to document," said Applications Supervisor Ralph Draper. "But there's still room for creativity within the individual application."

**Hartford Insurance Group's programming staff includes (left to right) Ralph Draper, applications supervisor; Carolyn McNamara Sluis, programmer; and Christopher Caulfield, programmer.**

# Productivity More Than Watchword

at both the corporate and divisional levels (see story below). Code is indexed on IBM's Storage and Information Retrieval System (Staira) on-line indexing facility under IBM's CMS. Thus, a user can search the Stairs index and switch to CMS to retrieve a piece of code.

To standardize testing and maintenance procedures, the department brought in automated documentation and testing tools such as Management and Computer Services, Inc.'s Datamacs; Application Development Systems, Inc.'a Xpediter; and Multitask, Inc.'s Libxref and "inspections," a system of formalized walkthroughs that provide peer-group input on design and coding (see story on Page 8).

Productivity efforts are now beginning to pay off, but Crawford emphasized that the planning process was painstaking. "The best decision we made right at the beginning was the full-time commitment of people," he said. "There are a lot of companies talking about productivity, but you won't find too many saying, 'We're going to put 15 people full-time on making this thing happen and nine full-time people in the support mode.' That'a probably a half-million dollars a year."

CW Photo by P. Gillin

**Marcia Tingley, director of DP systems at the Hartford, heads the productivity support program.**

## *Reusable Code Embraced As Productivity Mechanism*

HARTFORD, Conn. — As it looked for areas of potential productivity improvements at the Hartford Insurance Group, the task team noticed that reusable code was already used widely but informally in the DP department.

The Hartford'a task, then, was "to identify a set of criteria for modules that lend themselves to reusability and to find a vehicle to communicate the availability of those routines through the shop," said Assistant Vice-President of Information Management Systems Jack Crawford.

The department has identified major areas of reusable code and installed IBM's Storage and Information Retrieval System on-line indexing facility under IBM's CMS to offer the entire programming staff access to the "canned" routines.

According to Michael Cavaliere, a systems analyst in the resource center of the Systems Support Division, reusable code at the Hartford falls into six major categories:

- *Common modules* perform standard routines, such as interest rate calculation, and can be utilized with a minimum of programming expertise. These modules can be invoked directly from the program under development.
- *Common file descriptions/record descriptions* offer consistency and time savings when developing programs, Cavaliere said. These will be offered via a data dictionary.
- *Program skeletons* are Cobol tools that eliminate the need to code routines like division headers and identification lines. The department supports static skeletons on IBM's TSO, which provide a source code data set that the programmer can modify, and a dynamic skeleton called Fastball on IBM's VM/CMS.

Developed internally by Systems Analyst Phil Archambeault, Fastball is a menu-driven skeleton that allows the user to build a Cobol module by calling routines from a series of menus. The skeleton itself contains a number of reusable code routines and is very popular on development projects, Cavaliere said.

- *Logic structures* provide the high-level procedural logic necessary to perform the program functions sopporting them. The programmer enters the information on low-level logic, and the high-level logic is precoded.
- *Clists (on TSO) and Execs (on VM/CMS)* are precoded commands that can be used repeatedly for functions like links or temporary memory expansion.
- *Working storage generators* allow a programmer to enter a report layout on the screen and use the generator to produce the Cobol code.

"Reusable code is intuitively a good idea," Cavaliere said, but acknowledged that "it'a perhaps the most suspect in terms of measurement. It's damined hard to figure what you've saved by it."

# International Report

*FROM THE CW INTERNATIONAL NEWS NETWORK*

***The 'International Report,' which appeared in these pages for the first time last week, is a new regular feature summarizing significant events in the worldwide computer industry.***

***The reports here have been dispatched over the CW International News Network, which currently links 11 newspapers published around the world by CW Communications, Inc. (CWCI). Eight more CWCI newspapers will join the international network on July 1.***

***Stories selected by international editors at each publication are sent over the network on a daily basis. The CW International News Network is coordinated by International Editor Susan Blakeney, who is based at CWCI headquarters in Framingham, Mass.***

## AUSTRALIA

MILSONS POINT — A multi-million-dollar contract to supply Australia's Department of Social Security (DSS) with Wang Laboratories, Inc. Wang VS series minicomputers, workstations and peripherals has significantly strengthened Wang Computer Pty. Ltd's position in the Australian marketplace.

According to Wang's Managing Director Mike Clarkin, the $63 million order will give the company the shot in the arm it needs to eventually oust International Computers Australia Ltd. from its No. 2 spot in Australian computer revenues.

While IBM retains the lead in computer revenues worldwide and sets most of the industry standards, its proposal for the DSS contract was rejected. The DSS, which sooght a combined data processing/office automation solution to its problems, reportedly leit that IBM'a proposed 8100 system was unable to do the job.

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CANBERRA — While the vendors may get all the glory for winning the recent Department of Social Security contract, the less obvious winner is the Australian economy. A government policy here called the Canberra Act dictates that any foreign company obtaining a contract in excess of $1 million in Australian currency must plow a minimum 30% of the contract's value back into the Australian economy.

## FRANCE

PARIS — The French postal, telephone and telegraph (PTT) administration will conduct a study on the feasibility of equipping its Minitel terminals from the French company Telecommunications-Teletel with microcomputer and peripheral capabilities. The enhancements would include floppy drives, smart card decoders and printers that would make the terminals more useful for professional users. The problem the PTT foresees is the huge price difference between a dumb terminal and one with microcomputer capabilities.

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PARIS — Bull-Sems, a subsidiary of the state-owned minicomputer group Bull, unveiled a new strategy to focus on the development of its Mini 6 (also known as Level 6) series of minicomputers for transactional processing. The strategy also calls for licensing agreements for 32-bit technology with Norsk Data of Norway and Harria Corp. of the U.S.

## JAPAN

TOKYO — IBM Japan Ltd. has reached an agreement in principle to purchase a 35% interest in the Japan Business Computer Co. Ltd./Nikkyo Denki Industry Co. Ltd. (JBCC/NDK) Group. JBCC/NDK is said to be one of Japan'a largest independent small business computer firms. The agreement was reached after two months of negotiations.

IBM's move to develop and market small machines with JBCC/NDK is seen as a strategic one. IBM had alipped to the No. 2 apot behind Fujitsu Ltd. in Japanese sales, sources said.

Other recent IBM moves in Japan have included a number of agreements with Japanese OEMs, the establishment of lease financing and joint venture arrangements.

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TOKYO — Software products programmed in Basic soon could be completely portable and compatible with a wide range of microcomputers. Fifteen Japanese personal computer manufacturers agreed to standardize more in their development efforts, including the adaptation of standard read-only memory cartridges written in Basic. The group included representatives from Nippon Electric Co., Fujitsu Ltd., Hitachi Ltd., Toshiba, Ltd., Mitsubishi Electric Corp., Sharp Associates, Canon and Sony Corp.

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TOKYO — Konishiroku Photo Industry Co. Ltd. has unveiled a full-color ink-jet printer which reportedly outperforms other products in its class by a factor of two. However, customers have to wait more than 18 months to receive their JC 16A printers, which are said to operate at approximately 50 sec/page.

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TOKYO — The Ministry of International Trade and Industry is reportedly working on software legislation that would protect the software developer's rights of ownership to computer software programs. A government agent said Japan's current registration (copyright) law is not enough to protect these rights because the real value of software should be recognized as a great asset and contribution to Japan'a emerging software industry.

## PEOPLE'S REPUBLIC OF CHINA

BEIJING — Nanjing Telecommunications Works has entered into an agreement to purchase $2 million worth of convertible preferred stock from Santec Corp., a manufacturer of dot matrix printers based in Amherst, N.H. The Chinese company also reportedly intends to form a joint venture with Santec to develop, produce and market printers in the People's Republic of China.

## WEST GERMANY

COLOGNE — Franz Arnold, former ministry director of the postal, telephone and telegraph (PTT) administration, predicted that IBM'a Systems Network Architecture (SNA) will progressively decrease in popularity. Arnold made this claim during the Telecom '83 conference, an international symposium on telecommunications held here recently. Arnold also predicted that a transparent network model for an integrated services digital network might eventually supersede SNA.

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COLOGNE — Deutsche Lufthansa AG, West Germany'a national airline, has become the country'a first user of the Ethernet local-area network from Rank Xerox Gmbh. Lufthansa spokesman Klaus Kinder reported that the Initial experience with Ethernet has proven "very positive."

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WOLFSBURG — Triumph Adler, a German vendor of small business systems and a subsidiary of Volkswagen-Werk AG, increased its annual worldwide revenues and decreased its losses compared with a year ago.

Triumph Adler reported annual worldwide revenues of $786 million vs. $782 million last year. Losses were reduced from $156.8 million last year to $53.6 million.

"These figures are not good yet, but they are better than last year," said company Chairman Peter Niedner.

## DENMARK

COPENHAGEN — Tandem Computers, Inc. has consolidated its European operations into Tandem Computer Europe, a new division that will become operative Oct. 1. That announcement came at the company's annual European users group meeting held here recently.

*Hardware and Software*

# IBM Gives Schools $40 Million in CAD/CAM

By Bob Johnson
CW New York Bureau

NEW YORK — IBM announced here last week that it has awarded nearly $40 million in computer-aided design and manufacturing (CAD/CAM) hardware and software to 20 universities. The grants were made as part of a corporate program to encourage education in manufacturing systems at American engineering schools.

IBM said the award was the largest single grant of any kind in the company's history. The funds will be used to supply the selected schools with systems to teach up-to-date techniques in design and manufacturing to students in mechanical engineering, computer science, business and architecture.

Later this summer, IBM will announce the names of five additional universities that will receive $10 million in cash grants to implement improved manufacturing systems curricula at the graduate level.

Each of the 20 universities named last week to share the $40 million grant (see box) will receive an IBM 4341 Group II processor; nine IBM 3251 graphics terminals; four 3279 color display terminals; four 3101 remote CRT terminals; and I/O equipment for teleprocessing, magnetic tape, cards and printers.

Software is being supplied by IBM and four other companies. Cadam, Inc. of Burbank, Calif., is donating a graphics system for CAD/CAM; Dassault Systems of Paris is donating its three-dimensional interactive application package; Bell Northern Research Ltd. of Canada will supply a CAD tool for printed-circuit board design and manufacturing; and Structural Dynamics Research Corp. of Cincinnati is providing a computer-aided engineering design system.

In addition, IBM will provide royalty-free licenses for any appropriate, existing IBM software, including the VM and MVS operating systems; language support for Fortran, APL, PL/1 and Pascal; and support for general graphics, development, information systems, office and training applications.

IBM said it awarded these grants for a number of reasons, primary among them was its concern with U.S. manufacturing productivity and quality and its ongoing commitment to education. "We are on the threshold of a new era in manufacturing technology, and there is a critical need in industry for people who can make full use of that technology and enhance it in years to come," IBM Chairman John R. Opel said. "There can be no factories of the future unless there are universities of the future educating those people now."

Very few universities can afford to build actual production lines on campus as teaching laboratories, he added, and most of the equipment that they have is worn and obsolete. "We decided we should act to help close this gap," he stated.

The 20 chosen universities, which represent 14 states and the District of Columbia, are both private and state-supported and range in size from 1,200 to more than 54,000 students, IBM said. They were selected from 115 proposals that were sent to the company in response to its manufacturing engineering grant program initiated last September.

More than 75 of the universities that submitted proposals were visited by 40 IBM reviewers during the evaluation process. Selection was based on a National Science Foundation system under which each proposal received three reviews and was rated on a scale.

## The Winners

The 20 universities that will share IBM's $40 million computer-aided design and manufacturing grant are Arizona State University, Boston University, Brigham Young University, the University of California at Los Angeles and California Polytechnic State University in San Luis Obispo.

Also, the University of Florida, George Washington University, Georgia Institute of Technology, University of Illinois at Urbana-Champaign, Lehigh University, the University of Massachusetts at Amherst, Michigan Technological University, University of Missouri-Rolla and Ohio State University.

Also, Polytechnic Institute of New York, Rensselaer Polytechnic Institute, San Jose State University, University of Texas at Austin, Utah State University and Virginia Polytechnic Institute and State University.

# State Kicks Off DP Literacy Plan With Summer Camp Program

BOSTON — Massachusetts' first statewide program for computer literacy was announced last week by Gov. Michael Dukakis and Secretary of Economic Affairs Evelyn Murphy.

A computer camp program will give 760 disadvantaged youths in five major cities hands-on instruction in the use of computers while employed in the Comprehensive Employment & Training Act (Ceta) summer jobs program. The $500,000 program is being funded by Bay State Skills Corp., a quasi-public corporation that is a part of the State Department of Economic Affairs. The group is wholly funded by the state and incorporated in the private sector.

Digital Equipment Corp. played a central role in developing the curriculum, training the staff and integrating plant tours and computer career possibilities into the theoretical training, according to a spokesman for Bay State Skills.

The camps will be located in local high schools equipped with a variety of computer equipment. The program will begin July 5.

# U.S. Urged to Push International Privacy Rules

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The head of a State Department advisory group on transborder data flow last week suggested the U.S. should renew efforts to win American companies' endorsement of international privacy guidelines.

Hugh Donaghue, a Control Data Corp. vice-president and chairman of the State Department's private-sector data flow working group, fears that European officials feel U.S. firms are giving only lip service to the guidelines, which cover privacy protection in the transfer of personal data. The guidelines were developed three years ago by the Organization for Economic Cooperation and Development (OECD).

The guidelines have been endorsed by the U.S. government and more than 200 American firms and organizations, but concern about the extent of that endorsement surfaced recently when the results of an independent survey on the guidelines were made public. That survey, conducted by Business International Corp., (BI) found that many firms formally endorsing the guidelines have done little or nothing to implement them [CW, May 9].

Donaghue, discussing the survey at a recent meeting here of his advisory group, said the BI study is causing a lot of comment in Europe. Foreign officials evidently feel it confirms that U.S. efforts to implement the guidelines fall somewhat short of American government representations to the OECD.

While Donaghue said he has detected no immediate threat to the data transmission practices of U.S. firms resulting from the survey, he has "a gnawing feeling of concern" about the effects of the BI study.

Therese Revesz of BI confirmed the reports on the survey's findings and told the meeting that "there is a very dangerous knowledge gap within companies" about the specifics and the requirements of the guidelines. Revesz added, however, that only about one-third of the European firms that were surveyed in the BI study have taken steps to implement the guidelines endorsed by their governments.

When the guidelines were first developed, U.S. Secretary of Commerce Malcolm Baldridge initiated a program to solicit their endorsement by American multinational corporations. Although that effort was successful, there has been little follow-up to that program, which was administered by Commerce's National Telecommunications and Information Administration (NTIA).

### Burden on Private Sector

Kenneth Leeson, formerly an NTIA official and now with the State Department's International Communications and Information Policy Office, called the endorsement campaign "very energetic and wide-ranging," and suggested it is now up to the American private sector to implement the guidelines. "I think a lot of the burden rests out there," he commented.

Although it was suggested at the meeting that U.S. firms may not be taking active and open implementation measures because they feel their policies and practices already conform to the guidelines, reports from Europe indicate data protection authorities there are looking for American firms to publicize their endorsement.

Donaghue suggested the possibility of developing a joint government/private-sector project to increase endorsement of the guidelines and to educate U.S. firms to the need to publicly implement them.

## IEEE Offers Directory Of Members for '83

PISCATAWAY, N.J. — The Institute of Electrical and Electronics Engineers (IEEE) has published its "1983 IEEE Membership Directory." The 1,500-page manual provides names, current locations, titles and telephone numbers (where authorized) of more than 200,000 IEEE members and affiliates.

In addition, the directory contains listings of over 3,500 IEEE fellows; winners of 24 major IEEE awards for outstanding achievement in science and technology; IEEE past presidents and directors; and a section on the purposes, organization and history of the institute and requirements for various membership grades.

The directory is priced at $30 for members and $75 for nonmembers from IEEE, 445 Hoes Lane, Piscataway, N.J. 08854.

## AMS Elects Jacobson International Chief

WILLOW GROVE, Pa. — The Administrative Management Society (AMS) has elected Richard H. Jacobson as its international president.

Jacobson is vice-president of administrative services at Blue Cross and Blue Shield United of Wisconsin. He was AMS's first international vice-president in 1982-83 and has also served as vice-president of management education, chaired the International Chapter Programming Resources Committee and served on four other international committees.

Jacobson has received AMS' Merit and Diamond Merit Awards.

*Despite Earlier Concern*

# COE Privacy Pact's Threat to U.S. Downplayed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A European privacy protection treaty expected to go into force later this year has raised concern that it may lead to restrictions on data flows to this country, but government and private-sector observers here recently suggested the treaty may be less of a threat than it first seemed.

The Council of Europe (COE) treaty sets standards for protecting the privacy of personal data in electronic transmissions and will supersede national data protection laws for those countries that ratify it. It would also allow signing countries to restrict data transfers to nonsignatory countries that do not provide equivalent privacy protections.

It is the last provision that has raised fear in the U.S., which does not have a national data protection law, as many European nations do. Moreover, the U.S. is not a COE member and, thus, will not ratify the treaty, although it could conceivably assert that it embraces the treaty's principles.

Some corporations have expressed concern about the treaty's effects. They note that the U.S. has relied on voluntary privacy guidelines, which will carry less weight once the treaty is in force, to ensure relatively unimpeded data flows between Europe and the U.S. [CW, Feb. 28].

One observer who feels the COE treaty is less threatening than some in the U.S. fear is G. Russell Pipe, an American consultant who has worked closely with COE and with the Organization for Economic Cooperation and Development (OECD), which wrote the voluntary guidelines. In a recent interview, Pipe suggested the treaty could actually benefit U.S. multinational firms.

Pipe noted the treaty will establish a free-flow zone among the countries that ratify it and, thus, could ease any restrictions on U.S. firms that set up a European data transmission facility within one of those countries. "A company that's clever enough to put its regional computing center in a country with a strong [national data protection] law" could find its inter-European transmissions greatly facilitated, he observed.

### Single Gateway

Pipe also suggested U.S. firms could establish a single gateway for U.S.-European transmissions in a country that has ratified the treaty and looks favorably on U.S. business investment, such as Ireland. Although other treaty signers could conceivably restrict transmissions sent from their countries to the gateway country for transmission to the U.S. (if they feel the U.S. does not offer adequate privacy protections) Pipe said that is not likely if the gateway country is in good standing in the European community.

He also noted that any possible deleterious effects of the treaty are not likely until it has been ratified by a large number of COE nations, which is not expected for some time. In the meantime, he suggested the U.S. government should work closely with COE and with European data protection authorities to try to persuade them that U.S. privacy laws offer adequate protection for personal data transmissions.

"The U.S. has a body of public laws which, I think, can be asserted to provide adequate protection," Pipe said. He added that European data protection authorities are by and large not legal nitpickers; rather, they look at data protection as a human rights issue. "Data protectors are more interested in fair and equal treatment of records," he said, not in legal technicalities that might be used to hurt U.S. firms.

Pipe's arguments recently were supported by U.S. State Department officials, who sought to downplay the supposed threat of the COE treaty. Lucy Hummer of the department's Legal Advisor's Office said there are indications that European nations would not move to alter existing policies on data transmissions to the U.S. substantially when the treaty goes into effect.

She added that "it would be helpful for American firms to be public about what they are doing" to protect personal privacy in data transmissions. It would particularly be helpful if they would publicly endorse the OECD privacy guidelines.

Kenneth Leeson of the State Department's International Communications and Information Policy Office added, "I don't think [European] privacy laws and privacy regulations are going to cause problems for [U.S.] firms." He said that despite all the attention given to this issue over the last several years, major privacy abuses by U.S. multinational corporations have yet to be found.

So long as that situation continues, according to Leeson, there probably will be no massive effort to restrict transmissions to this country from Europe. But that could change, he warned.

# Token-Based Local Nets Forum To Be Held July 20-21 in D.C.

MINNEAPOLIS — Architecture Technology Corp. will hold its second Token-Based Local Networks Forum July 20-21 at the Hyatt Regency Crystal City hotel in Washington, D.C.

The forum is intended to bring together manufacturers and current and potential users of token-based local networks in an informal setting, a spokesman said.

It will feature manufacturer presentations, a manufacturers panel discussion with audience participation, a technology summary and an audience-participation discussion with a panel of users, the spokesman said.

A separate session will describe a token-based broadband network and the current views of IBM on token-based networks, the spokesman said.

The forum can be attended for a registration fee of $395. More details are available from Architecture Technology, which can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

# Terminal Manufacturers Faced by Quandary

*(Continued from Page 1)*

lower labor costs and government-bestowed tax breaks.

Given this situation, the only marketing opportunities for terminal manufacturers consist in selling to large corporations such as E.F. Hutton, which decided to upgrade its minicomputer-based terminal network rather than purchase micros, or to smaller businesses that need terminals to attach to their multiuser micros.

But terminal makers may lose a generous share of those marketing opportunities as more and more large corporations replace their knowledge workers' terminals with micros and as traditional suppliers of multiuser micros — Altos Computer Systems, Inc., for example — make plans to supply their small business customers with their own terminals.

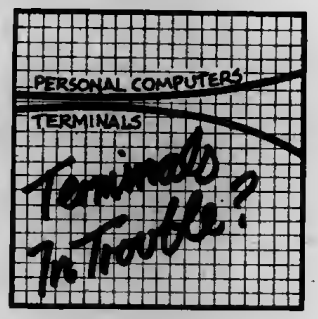
## Industry Spotlight

Dick DuBridge, executive vice-president of finance and administration for Televideo, Inc., one of the few terminal manufacturers to make the crossover to the microcomputer business successfully, contends that terminal manufacturers fail in the microcomputer market because they do not understand the complexities of microcomputer software and distribution.

"They really have to understand software," DuBridge stressed. "They have to know what is available and what it runs on. Another problem is that [selling micros] takes different distribution channels. Our distributors that are good at selling printers and terminals don't know anything about software and computers.

"I'm sure the same thing is true of our microcomputer dealers — they are not expert at selling terminals and printers," DuBridge remarked.

Market analyst Ken Bosomworth, president of International Resource Development, inc. (IRD) in Norwalk, Conn., thinks it would be a good idea for terminal manufacturers to connect in some way with the microcomputer business. "The dumb terminal business is not a very interesting, profitable or growing business," he explained, hastening to add, "That is not to say many of these companies should get out of it. It is just to say that if they are looking for growth opportunities, they might as well find them in the business of microcomputers."




Kathy Raftery, director of marketing for Lear Siegler, Inc.'s Data Products Division, one of the major terminal suppliers that does not offer a microcomputer, admits micros are making inroads into some of her company's markets, but doesn't share some analysts' vision that micros will soon relegate terminals to the history books.

"Micros are being used in some applications where terminals were previously used, but they are applications where a financial analyst, for example, might have been using a terminal but needed a device that has some local processing power," she said.

### Application-Dependent

Raftery contends that because the decision to use either a micro or a terminal is still very much application-dependent, the terminal's place in both large and small corporations is assured.

"There are some applications in data entry environments where the data processing manager really doesn't want the operator to have that much control over what goes into the computer," she maintained, implying that microcomputers would permit operators to manipulate proprietary data that they should not be allowed to change.

What is prompting so many large and small companies to consider replacing their knowledge workers' terminals with microcomputers is the stand-alone processing capabilities and multifunctionality of the latter. "In some applications, it is very convenient to have a device which can be used as a terminal one minute and then as a word processor and calculator the next," observed IRD's Bosomworth.

Advocates of minicomputer-based terminal networks counter this point by saying most of today's telecommunications software reduces 16-bit microcomputers to dumb terminals because it is not sophisticated enough to tap into all of a system's capabilities. Consequently, they claim, users would be better off with a much less expensive dumb terminal until more sophisticated software comes along.

# Hutton Tells Why It's Sticking to Terminals

Industry Spotlight

By Ed Scannell
CW Staff

Unlike many large corporations, E.F. Hutton has decided not to incorporate large numbers of microcomputers into its distributed processing system. Instead, it will integrate more capabilities into its existing minicomputer-based tarminal network.

The New York-based brokerage house has decided microcomputers cannot deliver the kind of processing power a minicomputer-controlled network can and are more difficult to upgrade over the long term.

"Microcomputers have become popular because they are computers with training wheels," remarked Bernard Weinstein, first vice-president of the firm's communications and branch emulation systems.

"With microcomputers, you have entry-level applications, but we are more interested in a longer term strategy. We are thinking about where we will be five to seven years down the road," he said.

Weinstein explained that E.F. Hutton is interested in supplying its knowledge workers' terminals with more functionality, but does not want to place another unit on those workers' desks because that is "pretty expensive real estate. [What we want to do] is a matter of integrating functions into the hardware that already existed."

One of the problems with microcomputers in a large corporation is that they are often isolated from the company's central data base. This, Weinstein said, presents individual users with the formidable responsibility of maintaining their own data. Terminal users tied to a central data base, on the other hand, can have their data updated automatically, greatly reducing the opportunities for error, Weinstein maintained.

Weinstein believes people have become too concerned with the hardware distinctions between microcomputers and terminals and do not spend enough time zeroing in on their functional requirements.

"There are a lot of ways to deliver the same type of functionality, and we chose what represented the most cost-effective way of delivering service to our brokers and users," he said.

E.F. Hutton's network centers on 350 Data General Corp. MV/4000 superminicomputers. Secretaries have access to the systems via DG Dasher workstations; account executives will be using Bunker Ramo, Inc. System 7s.

A company that has not made a commitment to either terminals or micros is United Technologies Corp. of Hartford, Conn., although the company DP manager, Dr. John Bennett, admits that a "fair number of micros are creeping into the [United Technologies' Hartford] division at various levels."

Realizing that the decision whether to use microcomputers depends on the application, he said, "Sometimes it is best to have some of the computing power and some of the storage at their [users'] locations rather than back at the central data processing facility. That is what clearly sold [Visicorp's] Visicalc to a lot of organizations."

While microcomputers handle word processing chores and generate charts and graphs easily enough, companies with engineering applications still require a "minicomputer engine," Bennett said.

## *Compromise Solution: Boards That Turn Terminals Into Micros*

Microprocessor-based boards that upgrade dumb terminals to full microcomputer systems seem to be a compromise solution for companies that cannot afford to replace their terminals with microcomputers.

While board upgrades seem to be a logical way of protecting a company's hardware investment, the idea has yet to catch on. One analyst pointed out that Digital Equipment Corp. has "a warehouse full of its VT18Xs," the slide-in board that turns its VT100 terminal into a Zilog, Inc. Z80-based microcomputer.

One of the major reasons users are reluctant to purchase boards like the VT18X is that "putting in a board is a blurry thing. Many people ask, 'Does it really turn a terminal into a full microcomputer or is it an after-the-fact kind of thing?' I think a lot of people are confused," said Russ Aldrich, Apple Computer, Inc.'s manager of product programming.

What may break down people's resistance to terminal upgrades is the Personal Computer attachment introduced by IBM last March that provides IBM 3278 terminals with Personal Computer capabilities. "I think the IBM announcement will really help to legitimize this approach," stated Craig Lippman, director of strategic planning for 3R Computers, Inc., which also makes upgrade boards for the 3278 and VT100.

Ken Bosomworth, president of International Resource Development, Inc., speculates that the Personal Computer attachment is IBM's way of responding to the demands of the increasing number of knowledge workers who have started using the 3278 over the last few years. "What that means for the 3270 business is that the growth of the market is being truncated by the desire of these new users to have things that are more flexible than traditional 3270-type terminals," he said.

Frank Gens, senior analyst with The Yankee Group, thinks the Personal Computer attachment is an evolutionary move designed by IBM to migrate slowly its 3270 base to the newer, more modular series of 3278 terminals.

"I feel what IBM has allowed them [older 3278 users] to do is to take a half step toward getting into the next generation of 3270 workstations," Gens theorized.

*To Curb High-Tech Espionage*

# U.S. Implements Visa Screening

By Patricia Keefe
CW Staff

WASHINGTON, D.C. — The U.S. State Department last month quietly unveiled a visa screening policy to identify individuals suspected of seeking entry to the U.S. to gain illegal access to control technology.

Control technology encompasses technologies listed on the Commodity Control List issued under the Export Administrative Act, the Munitions Control List of the Arms Export Control Act, technological regulations of the Atomic Energy Act and the National Security Classification System, according to John Caulfield, a State Department spokesman.

The visa screening policy was developed to aid consular officials abroad who might otherwise be forced to make e decision on whether to grant a visa based on little or no background information on the applicant, Caulfield said. He added that the policy is aimed almost exclusively at Warsaw Pact citizens.

Under the new policy issued by the Office of Science and Technology, visa applications from communist countries received by consular staff ebroad are now referred to the State Department. A computerized search is then initiated through e pool of information that the State Department has amassed on potential and actual agents of high-tech espionage, Caulfield said. Included are files on individuals from noncommunist countries that mey act as agents, legally purchasing equipment in the U.S. and then diverting the technology through dummy companies overseas in order to make illegal sales to Warsaw Pact nations.

The new policy is an offshoot of the State Department's "fairly recent perception" of the problem of illegal high-tech exports, Caulfield said. The aim, he added, is to eliminste the problem from the start rather than risk any restricted technology getting by egents for Operation Exodus, the code name for the U.S. Customs' crackdown on illegal exports of high-technology equipment [CW, Nov. 22].



# *Copyright Office Seeks Comments On Public Access To Programs*

WASHINGTON, D.C. — The Copyright Office of the Library of Congress is seeking public comments by July 18 on the question of public evsilability of copyrighted computer programs that contain trade secrets.

Because of the number of inquiries and requests for special relief it has received, the Copyright Office is reviewing its regulations with respect to the mandatory filing of materials to be copyrighted.

The existing regulations require depositing with the Copyright Office "one copy of identifying portions of the program," meaning the first end last 25 pages or the equivalent. In eplying this regulation, the Copyright Office has considered the source codé format of e computer program as the best representation of euthorship and, therefore, satisfying the "identifying portions" requirement.

However, the Copyright Act requires that all copyright deposits be open to public inspection, a rule that is not superseded by the Trade Secrets Act. DPers often argue that public access to such works destroys or impairs their value to the copyright owner.

On the other hand, for those who must rely on the public record in infringement actions and commercial transactions, depositing minimal identifying material instead of actual copies could be seen as weakening the value of the registration record In litigetion.

Interested persons ahould submit 10 copies of their written comments by July 18 to the Office of the Generel Counsel, U.S. Copyright Office, Library of Congress, Department DS, Washington, D.C. 20540.

More information on the specific issues of interest to the Copyright Office is eveilable from Dorothy Schrader, General Counsel, Copyright Office, Library of Congress, Washington, D.C. 20559.

# Newsletter Out On Software AG

HOUSTON — "The Netural Light," a free newsletter for users of Software AG of North America, Inc.'s Adabas and Natural products, has been announced by Lone Star Software, Inc.

The newsletter is designed to provide information about the products from other users and from independent vendors, as well as to serve as a advertising vehicle for Lone Star products end services.

Initially, the newsletter will be published every six weeks and will contain articles of general interest and tips to assist in the use of Adabas and Natural. The first issue will contain a review of the recent Software AG users conference and e comparison of the methods of using Adabas from e management point of view.

Further information about the newsletter can be obtained from Lone Star Software, Suite 540, 507 E. North Belt, Houston, Texas 77060.

*Establishes Internal Computing Facility*

# Bank Becomes First to Integrate Hogan Packages

By Jeffry Beeler
CW West Coast Bureau

DENVER — One of this city's leading banks recently became the first user organization anywhere to "go live" with Hogan Systems, Inc.'s full line of integrated applications packages.

The Central Bank of Denver is by no means the only customer of the Dallas-based vendor's product family, which consists of software modules for applications like demand deposit accounting (DDA), savings, certificates of deposit and retirement accounts. Hogan's programs, in fact, have already found their way into banks throughout the U.S.

Bot at all the other installations, the vendor's product line is still being applied only in bits and pieces. Only the Central Bank of Denver is running all the members of Hogan's software family at the same time under one roof.

Unlike other users, many of whom have yet to progress much beyond the installation of the DDA module, "we've completely tied the various parts of Hogan's system together," according to the Central Bank's assistant DP vice-president, Steve Kostiuk.

"We've shown that the system does operate in a production environment. No one else has ever integrated all the packages and gone live with them to see if they work."

Kostiuk's claims to first-user status were recently verified during a phone conversation with a Hogan Systems spokeswoman.

Installation of the Hogan application packages coincided roughly with the Central Bank's successful formation of its first in-house data center.

For years the bank had farmed all its financial application processing out to an independent service bureau. But by the early 1980s, the service bureau's programs had become seriously outmoded and had left the bank unable to respond quickly enough to its users' requests for new, greatly expanded systems, Kostiuk recalled.

So in 1981, the bank decided to sever its long-time service bureau ties and establish its own internal computing facility. At first, the data center was equipped with an IBM 370/158 Model 3, which later gave way to the bank's current system, built around an IBM 4341 Group II running MVS/SP 1.1.

Conversion from the service bureau to the in-house systems department took 47 days, compared to 90 days for a similar switch-over at another bank in town, and ended in February 1981. Three months later, Kostiuk and his associates began installing the first of the Hogan application packages.

Since then, the bank has gone live with Hogan's programs for DDA, line of credit, debit cards, certificates of deposit, retirement accounts and savings. Also included in the installation are the software vendor's customer information and relationship product management (RPM) systems, Kostiuk said.

The last of the application modules was integrated and went into production in late March of this year. Once bank officials finish entering the necessary dats into their RPM system, they will for the first time be able to provide full "relationship banking," a much-coveted capability among today's financial institutions.

Interest in relationship banking, which allows banks to evaluate the profitability of each of their customers and pinpoint areas where services can possibly be improved, is being fueled by shrinking profit margins and growing competition. Major brokerage houses, nationwide retail store chains and other organizations are entering the financial services field in droves and are increasingly pursuing businesses that until recently traditional banks had regarded as their exclusive preserve.

During the three months since they first went into operation, the Hogan programs have greatly speeded the Centrai Bank's efforts to develop and install new automated services. "We no longer have to assign five [of our DP] staff members to work for a month when we want to deliver a new system," Kostiuk said.

"A new certificate of deposit application, for example, took us only about half a day, excluding product testing, to put into place," he said. Under the previous regime, the same installation project would probably have taken at least two weeks to complete, he said.

# NTIS Begins Weekly Publication Of Foreign Technology Newsletter

SPRINGFIELD, Va. — The National Technical Information Service (NTIS) has begun publishing the "Foreign Technology Abstract Newsletter," which summarizes and classifies technology originating in some 50 countries with which NTIS has technical information exchange agreements. The first issue was released June 7.

The general subject areas covered include biomedical technology, civil construction, structural and building engineering, communications, computer technology, electro/optical technology, energy, manufacturing and industrial engineering, material sciences, physical sciences (applied) and transportation technology.

Published weekly, the newsletter is part of an effort to keep the U.S. industry posted on foreign technology developments. Ntis now has working agreements with official or quasi-government technical information services in Japan, Europe and other sources around the world.

Subscribers receive weekly issues containing 50 to 80 one-paragraph summaries (abstracts) of worldwide technology. Subscriptions include an Annual Index to give permanent reference value.

The charter subscriber rate is $75, a savings of $15 on the annual service. Subscribers should ask for "Foreign Technology Newsletter/TAY and send a check or money order to NTIS, 5285 Port Royal Road, Springfield, Va. 22161.

# Exec Sees Need for DDP Organizational Changes

By Robert Batt
CW West Coast Bureau

LAS VEGAS — In the distributed environment, traditional data processing reporting lines are inappropriate and new ones must be devised, American Bell, Inc.'s manager of technical support told attendees at the recent "Focus on Operations" conference held here by the Association for Computer Operations Managers.

Distributed processing argues for change in the DP organization itself, Hank Nichols said, although the functions of systems analysis, programming, data control, data entry and operations must be performed, regardless of any organization's format.

One approach, he argued, is to assign a systems analyst directly to a user department. Another approach is to have the systems analyst report directly to the director of data processing at corporate headquarters while permanently assigned to an end user.

### 'Major Function'

The major function of computer operations managers in a distributed environment, Nichols asserted, is to police the computer and its users and to update routine operations.

Suggesting that such professionals be referred to as systems managers, Nichols said they would be responsible for controlling access to a system; assigning and changing passwords; and most importantly, maintaining the data base, the content of which would be the user's responsibility.

"A new generation must provide a stable foundation for on-line, transaction-driven data base applications. Unlike architecture designed for batch processing, it must be highly reliable because on-line users become very frustrated if their system has frequent periods of failure," he added.

"Organizational change will not come easily. It will be resisted by some because it challenges traditional centralization of operations," Nichols warned.

Successful implementation of distributed data processing (DDP) requires a corporate computer plan, Nichols contended. Such a plan should encompass:

- A master program plan to control system development and to contain cost, schedule and performance objectives.
- A master systems design plan for creating the overall structural design for the system.
- A management plan describing the degree of autonomy that local nodes have in management.

Decisions, he asserted, must be made relative to distribution of management functions, such as system design, application development and system procurement.

The job of DP management, he suggested, is to plan the development of information systems balancing investment with anticipated added value.

Such a plan must include such functions as global design, technical support, quality assurance and consulting services.

He concluded: "Planning must be a lot better than in the case of centralized computing if a DDP system is to be successful. DP must move ahead and assume greater responsibility for the integrity of information services within an organization."



# Vendors Form VMEbus Group

SUNNYVALE, Calif. — A group of vendors designing systems around the VMEbus have formed the VMEbus Users Group. The group recently held an organizational meeting to appoint an advisory board and adopt a charter.

The VMEbus is a system architecture jointly developed by Motorola Microsystems, Inc.; Signetics Corp.; Mostek, Inc.; N.V. Philips; and Thompson/EFCIS. Users of the system include IBM; American Bell, Inc.; Harris Corp.; Perkin-Elmer Corp.; Sperry Corp.; and Bell Laboratories. In addition, many European companies use the VMEbus as a standard system architecture, according to the users group.

The VMEbus Users Group was created as a forum where users can communicate their needs and coordinate their activities, a spokesman said.

Membership in the users group is free. A spokesman for the organization said the group plans to puhlish newsletters and initiate a data base for VMEbus users.

More information about the group is available from Raymond T. Burkley, Astraea Computer Corp., 846 Del Rey Ave., Sunnyvale, Calif. 94086.

'It Works on the Binary System.'

*Pragmatic Strategy Seen Necessary*

# Lack of DP Contingency Planning Decried

By Robert Batt
CW West Coast Bureau

LAS VEGAS — Contingency planning in computer operations calls for a pragmatic business strategy which must be addressed by top management, a senior consultant warned here recently.

Paul Rosenthal, technical services director at Gottfried Consultants, Inc., said that for many companies the lack of contingency planning is an invitation to disaster. "It's time for a pragmatic approach to contingency planning, one in which if the computer center burned down, the company would continue functioning," he told executives at the Association for Computer Operations Managers (Afcom) Conference here.

Rosenthal, who has more than 30 years' experience in data processing, outlined a number of approaches to developing a contingency plan:

- The "tinker-toy" approach, in which each component of the system is viewed as a link in the overall structure. Backup and recovery are planned for each link in the processing network — including prime center, regional centers, distributed hardware, communications interfaces and terminals — with special concentration on the weakest links.
- A user-oriented approach that assumes total loss of computer support as the result of a disaster. This approach, Rosenthal said, addresses how the user would operate manually; how he would capture data; what customer policies would go into effect; and which outside services would be used for interim processing in the case of destroyed user facilities; for example, the loss of the accounts receivable clerical function.

This approach would also deal with such issues as backup facilities and offices for each company function; levels and priorities of services to customers; notification methods to employees and clients; mobilization of temporary or support employees; alternate telephone communications; and normalization of services.

- In a multicenter, multicomputer environment, the use of the company's own computer resources in the event of a major power outage or failure. This "use-one-to-fix-one" approach, Rosenthal said, is an on-line system which uses a computerized model at each site to process key inputs, including hardware capacity; job-stream interdependencies; processing windows; resources, such as files, equipment and supplies; constraints, such as sequence, timing and hooks; priorities; and risks.

In this strategy, the consultant claimed, the system determines the impact of the event and produces various tools, including master schedules and tactical plans; listings of applications which cannot be run; action plans; hardware and communications switches; and employee, customer and vendor notification.

- Sharing data resources. But there are problems with this approach, Rosenthal noted. "The most common type of sharing is a situation where instead of dependency on one computer center, there are multiple centers. The objective is to configure the various centers, as similarly as possible, both in terms of hardware and software. Over time, however, this strategy is becoming less viable as it gets increasingly difficult to keep a common configuration."

Another type of sharing is the concept of "mutual backup." Here, Rosenthal said, companies attempt to write and maintain modification software so that can run on each other's hardware.

A third sharing approach is the "empty shell" concept. This calls for a facility in which everything is installed except the computer, including sufficient communication lines, air conditioning and power to support one or more large processors. This type of facility, Rosenthal said, may be provided as a business venture by a private company, or may be organized by a group of users.

"In this concept, the most pressing questions revolve around the ability of the computer vendor to respond quickly in delivering the mainframe," he added.

Although a good deal of progress has been made in contingency planning, a lot still needs to be done, Rosenthal added. In particular, a methodology needs to be developed and proven that is practical, inexpensive to implement and makes sense for use by multiple companies.

Guidelines are also needed so that corporate planners can realistically estimate and budget for the setting up and maintenance of viable contingency plans.

Finally, "the best written plan is worth little if it has never been put to the test by turning off the computer and its peripherals for a couple of days. As a first step, users should remove a segment of the system one at a time and test the contingency plan for that piece of the system. It is not easy to do, but it is a critical step toward protecting the company and its future," Rosenthal concluded.

# *"Peugeot's automated manufacturing saves time, money and inventory through the unique capabilities of the Tandem NonStop System."*

Patrick Remy, Chef de Project
*Automobiles PEUGEOT, Centre de Sochaux*

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# TANDEM

## NonStop Computing Systems

# Method for Capacity Planning Outlined at Meet

By Robert Batt
CW West Coast Bureau

LAS VEGAS — A method for determining current system utilization and future hardware requirements was presented at the Association for Computer Operations Managers' (Afcom) Conference held here recently.

With users demanding faster turnaround times on jobs and on-line systems experiencing lengthy response times during peak loads, the capacity planning function is increasing in importance, Ray Ybaben, manager of office automation for TRW, Inc.'s Electronics and Defense Division, told conference attendees.

The first thing DP managers must understand, he asserted, is their current situation — how much of every critical resource in the data center is being used?

The critical resources, he contended, are CPU time, memory, channel time and peripheral time.

"It is an absolute necessity to have tools to gather utilization data, such as hardware and software monitors. With such monitors, it is possible to determine the percentage of time that a specific resource is busy. By then graphing the utilization data, a profile can be constructed of how busy the subject resource is during the course of the day," he explained.

### CPU Time Crucial

According to Ybaben, CPU time is the ultimate determinant of capacity. This means that if a service level is not being met and use of the CPU is nowhere near 100% when the jobs in question are being run, the problem is with a secondary resource.

If disk storage is at fault, for example, the problem can often be solved by reallocating data across additional drives or reorganizing files more often. A second reason for slow response times may be the network system supporting the terminals, he added.

Ybaben stressed the importance of recognizing the difference between bottlenecks and true system capacity. When a service level is not being met and the CPU is not exhausted, then a bottleneck exists either in the peripherals or possibly in the size of memory.

"Before giving any thought to replacing a current computer system, the operations manager must have a clear understanding of the service levels he is managing, and he must know how to recognize and resolve bottlenecks in the system that are sometimes false indicators of full capacity," he noted.

Citing rules of thumb rather than scientific data by which to judge computer operations, Ybaben suggested that:

- Utilization factors of 25% to 35% for channels and peripheral devices are reasonable. A rate of more than 40% usually indicates problems.
- For the CPU, sustained utilization above 85% of realizable capacity or momentary use above 95% for a five-minute period indicates potential danger.

When forecasting capacity requirements, Ybaben claimed the critical question is: How much capacity must be added to meet user requirements?

This will depend on how long a period a decision must cover. "Since technology has not slowed its pace, the tendency is toward short-term decisions, but should not be so short as to be constantly recommending changes," he advised.

The other factor to be considered, he suggested, is the growth rate of the sustained CPU utilization for a DP shop. This is difficult to find unless operations managers have been collecting CPU times for several months.

However, Ybaben added, it is possible to estimate a utilization growth rate by calculating weekly sustained computer usage as far back as one year if data is available. The estimation involves dividing CPU time for one week by realizable capacity for one week. (Thia can be expressed mathematically: Utilization = CPU time for one week/Realizable capacity for one week).

Using this statistic, the operations manager can calculate the starting level of utilization for the period over which the change is to last and thereby determine the amount of extra computing power needed, he concluded.



## TCA Conference Set for September

SAN DIEGO — The theme of the 21st Annual Telecommunications Association (TCA) Conference, which will be held here from Sept. 26 to 30, has been set as "Telecommunications — Gateway to the World."

Topics to be covered at the conference include office automation, new and enhanced international services including teleconferencing and networking, a panel on regulation after AT&T's divestiture and integration of voice and data.

The registration charge for non-TCA members is $500. The fee for all spouses, member and nonmember, is $50. There is a $10 charge for anyone wishing to visit the exhibit floor only.

More information on the conference is available from the TCA Conference Office at Suite B120, 1515 W. Cameron, West Covina, Calif. 91790.

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4. Application monitoring has been tested for over a year at current customers and is installed and running on Net/Alert Systems at: Home Insurance; Metropolitan Life Insurance; New York Telephone; St. Paul Insurance; and Xerox. It will be installed soon at Westinghouse and Walt Disney World.

REMEMBER: The following materials are available to send to prospective customers. Phone your requests to the Marketing Department.

- Net/Alert color brochure
- Avant-Garde's Primer on Network Management
- Case Studies, reprinted from customer evaluations of Net/Alert Systems
- examples of Net/Alert real-time color graphic status and performance displays, performance and utilization reports, and color analytical charts and comparison graphs, including application analyses
- Avant-Garde's product brochure, including Net/Switch and Tempo.

# Distributed Network Helps Banks Assess Risks of New Customers

CHICAGO — Banks and other financial institutions need up-to-the-minute data when assessing the risk of opening an account for a new customer. With millions of dollars at stake, many banks now rely on one company's distributed data processing network for that information.

Cheque Enquiries here provides banks with information on accounts that have created problems. "We don't guarantee checks," said James Stress, president of Cheque Enquiries, "but we do verify problem account activity."

With 20 terminals connected to a common data base, the company checks the names of potential bank customers for more than 7,000 banks in 21 states across the country. Among its services are:

- A 20-sec new-account verification procedure that is done via a telephone inquiry.
- A 30-day program designed to track and identify potential "kiters" — people who open multiple accounts for fraudulent purposes.
- A skip trace feature that aids in loss recovery for checking and savings accounts, credit cards and loans.
- A 30-day backup verification program that identifies late bank reporting of problem accounts.

To accomplish these tasks, Cheque Enquiries uses a Datapoint Corp. Attached Resource Computer system, which includes a Datapoint 6600 minicomputer with 120M bytes of main memory, two Model 6000 minicomputers, 20 Datapoint 3600 and 8200 terminals and a 600 line/min Datapoint 9258 printer.

### Average of 90,000 Calls

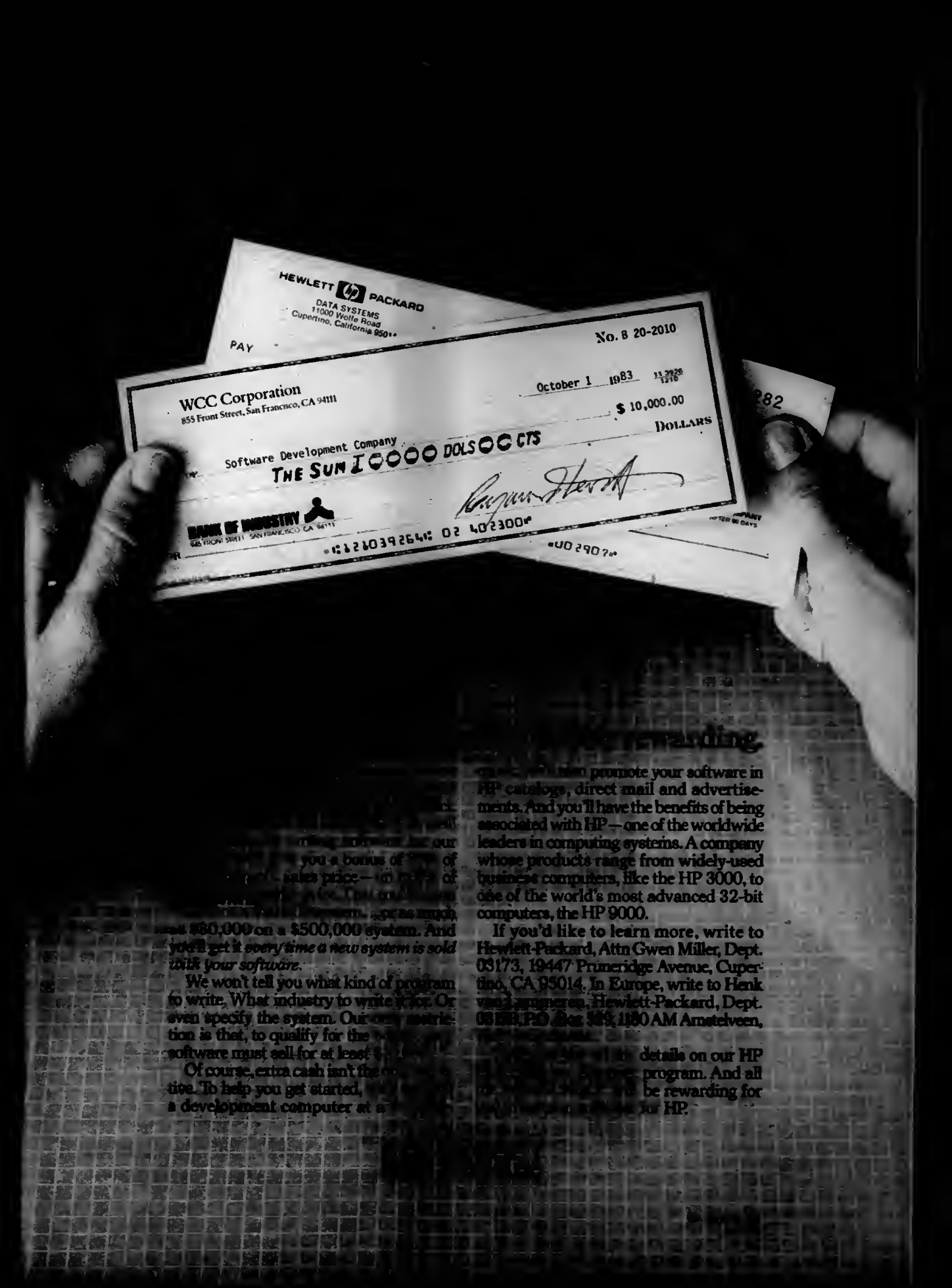
The 20 workstations and a rotating 12-hour shift allow 20 call-inquiry operators to handle an average of 90,000 calls monthly. A typical call involves obtaining the inquiring bank's code number, the name of the potential account customer and the last four digits of the customer's Social Security number.

Within 20 seconds, the operator will respond with either a "no record" or a "hit." If there is a hit, the operator provides the bank with the information listed on the record.

Before Cheque Enquiries implemented this system, it used a manual system to locate information on bad accounts. But as the company's data base grew from 70,000 names to 750,000 names, the manual system grew too cumbersome.

"We could give our customers a record that was printed out," Stress said, "but we couldn't tell them how many times a particular record had been searched out over a given period of time. It's important to know that."

Savings realized by the banks have varied, according to a Cheque Enquiries spokesman. One bank estimates the cost of opening and closing a checking account at about $50. Based on the number of hits experienced in one year, the bank estimated a savings of $24,000 by not opening bad accounts. Cheque Enquiries reports about 537 hits per year.

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# Boston Architects Cited for Use of CAD Tools

By Katherine Hafner
CW Staff

BOSTON — An architectural firm here recently won an award from *Building Design and Construction* magazine for "the most innovative use of computers and automation systems in the building industry."

But what most may call innovative, those at Stewart Design Group may well consider routine. For 17 years, Stewart Design, a 35-employee subsidiary of American Medical International, Inc., has been using computer-aided design (CAD) tools for designing everything from small surgical centers and racquetball clubs to complex hospital buildings.

Stewart Design began its use of computerized design tools in the late 1960s when it developed Ark 2, a graphics system for computer-aided architectural engineering. In 1982, the firm switched to Graphnet, a package developed by Graphic Horizons, Inc. of Cambridge, Mass., after serving as the system's professional guinea pig and consultant.

Clifford D. Stewart, president of Stewart Design, described Graphnet as a "relatively low-cost, turnkey system" that runs on Perq microcomputers from Pittsburgh, Pa.-based Three Rivers Computer Corp. The micros contain 1M byte of internal memory and 24M bytes of Winchester disk storage.

### 'Can't Talk About Toys'

"In the real world of architectural drafting, you can't talk about toys or little desktops," Stewart said. "You must have a computer with a large storage device and very good screen resolution."

All of the architects at Stewart Design work at individual workstations, a configuration Stewart prefers to a mainframe environment with multiple users, which he calls "too slow" for architectural engineering.

What distinguishes Stewart Design's use of CAD from that of other architectural firms, Stewart said, is its "broad spectrum" approach to design. Whereas most other architects restrict their use of the computer to drafting, Stewart Design uses the computer for every phase of designing a building.

"We think the tool is better used if it's applied not only to drafting or working drawings, but also to design and layout and a three-dimensional spectrum analysis of plans," Stewart said. Graphnet has four major interconnected programs: a data base management program, a plan optimization program, a drafting program and three-dimensional applications.

One of the major reasons Stewart Design received *Building Design and Construction* magazine's first award was its integration of all four program sets. The data base generates many of the optimization diagrams, as well as the elements drawn in the final layout for equipment and furnishing, making for what Stewart calls "a rather complete system."

The hardware includes a CRT screen of black lines superimposed on a white background and a tablet imbedded in a drafting board with a mouse, or cursor-driving device.

Using the three-dimensional application, either individual three-dimensional items can be entered or an entire plan can be presented in three dimensions with a vertical height.

"It's like taking the roof off the building and looking in, which we find very useful. Since it's automated, it doesn't require a great deal of work on the part of the designer," Stewart said. This aspect of automation provides "the whole clue" to his firm's applications.

"We try to use the computer to do the kinds of things that it does very well and have the designers do the things that they do very well and not make a machine do something that is not good for it," Stewart said.

"We've tried very hard to specify those things that designers find either tedious or difficult, and if they're the kind of thing that a computer can do, then we have the computer do it."

# Switch to Mainframe Meets Builder's Design

PITTSBURGH, Pa. — Realizing its four-year-old time-sharing services were no longer meeting its growing informational needs, a medium-size construction and engineering company here purchased a mainframe it claims will meet those demands in addition to opening up new business opportunities.

Alexis Tsaggaris, vice-president of Schneider, Inc., a $300 million per year provider of engineering, fabrication and construction services, said the new system will be an integral part of all the company's future planning, marketing and services operations.

"The [time-sharing] service was reliable, well-supported and met our needs," Tsaggaris related, "but we felt an in-house computer capability was vital to our business. Also, it melded with our 20 years of experience in design and engineering."

Over the past four years Schneider has been using Control Data Corp.'s Cybernet computers and time-sharing services. Tsaggaris said the company purchased a CDC mainframe, the Cyber 170 Model 815, for compatibility purposes and because he felt the system's storage capacity could accommodate the company's formidable number-crunching needs.

The process of transferring the files from the Cybernet computers to the new mainframe was a relatively painless process taking "about two days of modification work," according to systems analyst Donna Rogosky. She explained that the installation of major software programs such as Gtstrudl and Nupipe also went smoothly.

The company does not expect the new mainframe to be a panacea for all its problems, however. It intends to complement the 815's abilities with those of the Cybernet systems. A company official explained that the data will be relayed by the 815 to the Cybernet Center in Rockville, Md., for processing and then returned to the 815 for printout.

Besides taking care of the firm's engineering needs, the mainframe is expected to create new business opportunities by suppiying expanded services. One such service is used by the company's Land and Mapping Services group to provide records for gas and electric utilities, petroleum companies and county, city and federal government agencies.

The service provides maps for planning transmission lines, pipelines and roads and takes care of permit preparation, right-of-way information and communications with property owners, the company said.

"Many power utilities and government agencies still handle this information manually," noted Larry Stover, manager of the service. "We are now offering a data base management service that will process this information and report it in any way desired by our clients," he added.

For both its nuclear and fossil-fueled utility clients, Schneider specializes in providing piping stress analysis using CDC's Nupipe software program. The company recently completed an analysis of 50,000 feet of existing piping, supports and base plates for a large Pennsylvania electric utility using the 815 and Nupipe.

For its general construction business, the company will use the 815 along with a software program entitled Proplan, which is designed to assist in planning/scheduling and project management pursuits.

# FOUR LITTLE WORDS THAT STRIKE FEAR IN THE HEART IN THE 1980'S.

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# Casino Hits Jackpot With Move From Paper to On-Line COM

ATLANTIC CITY, N.J. — A casino and resort hotel here believes it hit the jackpot when it converted from paper to computer output microfilm (COM).

As a result of its switch, the Caesars Boardwalk Regency hotel here said it has been able to decrease its paper costs by more than 40% and eliminate 80 staff hours a week.

Caesars maintains the largest computer operation of any hotel and casino in the world. To run the resort, which consists of over 500 hotel rooms, 106 gambling tables and 1,385 machines, Caesars employs an IBM 4331 and 4341 and 100 on-line terminals, including color graphics displays. Until 1982, microfilm was used on a very limited basis, primarily for source document applications, and was produced by a service bureau.

Last year, however, management decided it would be profitable to install its own on-line COM operation to handle the increasing amounts of paper data produced on a regular basis.

### Storage Problems

"We ran into tremendous storage problems," recalled Richard Eidell, manager of operations at Caesars. By using COM instead of paper, the hotel could save over 1,000 cubic feet of storage space, as well as 40% of its paper costs.

A feasibility study of COM was begun in 1981, prompted by a strong interest in streamlining the existing DP network. Caesars looked beyond the traditional service bureau vs. in-house justification and instead considered the potential impact of COM on its entire data processing operation. Primary areas of concern included unacceptable turnaround time from the microfilm service bureau.

The hotel's requirement for immediate output, without duplicating its efforts first on paper and then on film, led it to explore the benefits of an in-house system. High-speed paper printers, off-line and on-line COM were some of the options considered.

Because of both the vast on-line terminal network already in operation at the hotel and its desire to integrate COM into the existing equipment, Caesars decided that on-line COM was the best choice.

A Datagraphix, Inc. On-Line Autocom II recorder was installed for the production of Caesars' COM output. Data is sent directly from the IBM mainframes to the COM unit, which operates at speeds up to 12,000 line/min. The data is printed on 4-in. by 6-in. microfiche, cut, dried and readied for immediate use.

Since the on-line unit interfaces directly with the IBM systems, minimizing or eliminating tape storage and operator intervention, Caesars has been able to reduce personnel.

On-line COM has proven to be a "natural addition" to a system that "always had efficient, cost-effective data management as its objective. It's a gamble that paid off for us in a big way," Eidell said, adding "I like to think that we hit the jackpot."

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# Managers on the Move

Thomas Hebert

THOMAS HEBERT has been appointed director of information resource management for Purolator Products, Inc. in Rahway, N.J. In his new position, he will be responsible for updating Purolator's entire information resources process.

Before joining Purolator, Hebert served as a consultant with Software Services of New England.

Hebert has a B.S. degree in accounting from Bryant College in Smithfield, R.I.

•••

GARWOOD E. ERICKSON has been named director of management information systems (MIS) for Hoover Universal, Inc. in Ann Arbor, Mich. Erickson will be responsible for all MIS functions, including design and implementation of advanced manufacturing and office systems.

Hoover Universal is a manufacturer of engineered parts and components for industrial, commercial and consumer use. The company employs approximately 6,500 people in 55 plants in North America and abroad.

Prior to joining Hoover, Erickson was office systems manager for Ford Motor Co.'s Parts and Service Division. He has held a variety of information systems positions with Ford since 1969.

Erickson holds an A.B. in engineering science/liberal arts, a B.E. in computer science and an M.E. in computer science from Dartmouth College and an MBA from the University of Michigan.

•••

DOUGLAS L. HEERDT has been designated senior vice-president of management information services for J. Walter Thompson Co. in New York. In his new position, Heerdt will be responsible for developing and implementing the advertising agency's worldwide data processing plans for both systems and hardware.

Heerdt was formerly employed by Bristol-Myers Co. for 18 years in systems planning and development, data processing operations, telecommunications and office automation.

He holds a B.S. in business from the University of Connecticut.

•••

THOMAS P. FLAHERTY has been appointed director of management information services for Gestetner Corp. in Gestetner Park, Yonkers, N.Y. In his new position, he will be responsible for expanding and implementing the management information department.

Prior to joining Gestetner, Flaherty was an independent consultant on MIS. From 1975 to 1982, he was manager of computer services for Reichold Chemicals, Inc.

He earned both MBA and BBA degrees from Iona College in New Rochelle, N.Y.

'My Blind Date Did Look Like a Movie Star . . . R2D2.'

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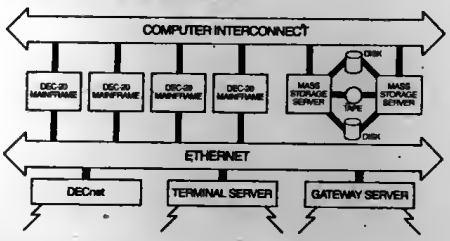


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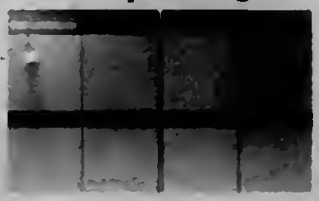

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*With On-Line Systems*

# Small Airline Lifts Off Against Big Competitors

SAN DIEGO — For a small airline company like Pacific Southwest Airline (PSA), finding inventive ways in which to use its DP facilities is a must in an increasingly competitive market.

The regional carrier, based here and serving the states of California, Nevada, Arizona, Washington and Oregon, is emphasizing on-line systems as it battles against bigger competitors such as United Airlines.

Six years ago, PSA's computer operations were limited, to put it mildly. The airline operated within California only, and data processing was confined to a basic inventory system for reservations, In fact, PSA had a total DP staff of five.

Today, the $475 million firm operates two Amdahl Corp AMD 470 V/6 machines, has developed its own passenger reservations systems and employs 121 people In the computer communications department, 31 of whom are programmer/analysts.

The computer systems at PSA now run 200 million on-line transactions a year and 2,800 batch jobs a month. In 1982, it was used to facilitate 7.2 million passengers, around 4,000 company employees and to schedule a fleet of 33 DC-9 and 727 aircraft.

"In most industries, computers are seen as devices to keep down and control costs. In the airline industry, however, computers are also seen as a means of providing revenue because they are the key to generating business," explained Art Landman, assistant vice-president of computer and communications services at PSA.

Landman and hia boss, Vice-President John Ford, are mainly responsible for the turnaround in computer operations at PSA.

The two executives joined PSA in 1976, having previously worked together at Rohr Industries, a manufacturer of airline accessories based in Chula Vista, Calif., where Ford had been corporate vice-president and Landman had been manager of computers and communications. Their mandate at PSA was to modernize completely the airline's computer services.

Both men have wide experience in data processing. Ford founded his own company before beginning his 18-year career at Rohr, while Landman is a former chief of communications and electronic processing for the Strategic Air Command of the Department of Defense.

When they came to PSA, Ford and Landman launched a five-year plan for getting the company on the right DP track, and they made some bold moves.. For example, PSA now performs all of its own computer maintenance with a staff of eight field engineers. Landman estimates that to contract the work outside the company would require hiring 79 manufacturing engineers. By doing the work Internally, he claimed, PSA saves $2.8 million a year.

They also wanted to use their Amdahl mainframes for both ticket reservations and batch processing. According to Ford, these jobs cannot be performed concurrently on the same machine using the IBM Passenger Air Reservation System (Pars), a standard system in the airline industry. This, he asserted, is because the operating system with which it is used — Airline Control Program — requires the mainframe to be dedicated to ticketing and reservations functions.

### Wasted Resources

To cost-conscious executives at PSA, the Pars system represented an undue waste of resources. "With one system tied up solely In ticketing and reservations, there is a need to be able to communicate with other computers, and this leads to tremendous overhead costs in terms of I/O devices," Landman explained.

To get around these problems, PSA amended Pars to include IBM's OS. "Using OS, we can segregate the computer Into separate operating systems so that we dedicate portions of the computer core to individual jobs which can then run concurrently on the same system," Ford noted.

The company has now embarked on its second five-year DP plan with the emphasis on building computer models that will allow senior management to monitor many more operations.

At the heart of this effort is the company's IDMS data base system, manufactured by Cullinet Software, Inc. "We have built bridges between the IDMS system and our reservations system so that now we have the capability of bridging any system we put in our data base," Landman said.

The need to have accurate and accessible data is shown by the fact that despite increasing its operating revenues by $37 million last year, PSA's net income dropped by $9 million to $19.45 million as the price war between the airlines escalated.

For Ford, who will run his computer operation this year on a budget of just $3.5 million, the job is to stay abreast of the competition.

"The industry is going to remain very competitive with customers demanding frequency of flights at low cost," Ford observed.


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# System Generator Helps College Convert to System With Common Data Base

BROOKLYN, N.Y. — A system generator helped an independent college here convert from a DP system that involved four separate file systems for its major application areas to an on-line system using one common data base.

Since 1976, administrative DP at Pratt Institute has been done on Burroughs Corp. equipment. The college currently has a Burroughs B1955 processor with 1M byte of memory and over 500M bytes of disk storage. This system supports a data communications network of 18 on-line terminals that service several campus locations.

D.S. Owings, director of the Pratt Computer Resource, explained that throughout the years, the DP system has treated the four major areas of student logistical support (registrar, bursar, financial aid and admissions) as four separate file systems. Although these systems interacted, there were problems of redundant and inconsistent data.

Because the first priority for Pratt Institute's expenditures is in the academic areas, the administrative systems and programming staff will continue to be small, Owings said. The staff includes a programming manager, who spends most of his time programming, and a junior programmer. Two others on the full-time staff of nine write occasional programs and do occasional maintenance. The mix of programs in the spring of 1982 was approximately 70% Cobol and 30% RPG.

Last year, Owings learned about Burroughs' Logic and Information Network Compiler (Linc), which was designed to generate both the data base schema and the programs to access and update that data base. "Despite some drawbacks which we were able to identify, we chose Linc as our tool for achieving a unified on-line data base," he said.

The basic element in the design of a Linc system is a screen, with each screen representing a separate file or logical collection of data. "What this limitation does is encourage strictly logical combinations of data; it particularly encourages grouping data according to the source of its entry and change," Owings said.

The initial screens are linked with secondary support screens and are accessed to obtain, verify or update various data elements.

"A major part of generating an application with Linc is providing a description of each screen both in its physical layout and in its logical or operational characteristics," Owings continued. This part of the Linc system is described using Linc Definition Language (LDL), which he said is "no less English-like than Cobol."

### 'An Analyst's Language'

"Linc has been advertised as an end-users' language. Our impression, however, is that it is an analyst's language," Owings said. "Using Linc, the systems analyst can quickly and with relative ease code a system himself. This not only speeds up the production of a working system, but also reduces the problems arising from the additional level of communication between analyst and programmer."

Owings said this does not suggest that end users cannot successfully use Linc. "Those who are willing to absorb the expense of learning it can obviously use it. However, where a system overlaps departmental boundaries, a referee will probably be desirable."

At Pratt, 8,700 lines of Linc code, which took about 45 man-days to produce, generated 35,000 lines of Cobol and a 750-line data base schema, he reported. "The code is written by someone who is neither a Cobol nor a data base expert, and it works."

Published reports indicate that a project estimated to take 24 to 36 months to complete was finished in 2½ months, according to Owings. "Yet another advantage is the reduction of required training," he said.

Pratt has found drawbacks with Linc. One of these is what Owings described as "lack of accepted programming characteristics, such as subscripting and performable subroutines," which can make coding awkward. "Some visual screen characteristics are annoying," he added, and the "documentation has room for improvement, although it has improved over the nine months of our experience."

Nevertheless, "we made a good choice," he concluded. "We were able to produce a prototype for our users to explore."

# HP 3000 Users Pick Scotland As Meeting Site

LOS ALTOS, Calif. — The HP 3000 International Users Group is sponsoring a conference titled "Accepting the Challenge of the '80s: Improving Business Productivity" Oct. 2-7 in Edinburgh, Scotland.

Delivering the conference keynote address will be Ed McCracken, manager of Hewlett-Packard Co.'s Business Development Group in Cupertino, Calif. Technical sessions reportedly will concentrate on DP management and policy, system management and operation, office automation, data communications, interfacing peripherals and foreign devices and a variety of applications.

Delegates from HP will offer tutorials on product strategy and support programs, plus workshops focusing on major HP system and applications software products.

The vendor exhibit will feature displays by HP, Tymlabs Corp., Qualex Technology, Inc., Quasar Systems Ltd., Hoskyns Group, Teamco and more than 30 other vendors from Europe and North America.

Full conference registration is $400. More information is available from the Conference Manager, HP 3000 IUG, 289 S. San Antonio Road, Los Altos, Calif. 94022.

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WANG

The Office Automation Computer People

AB73

# California State University Making Advanced Strides In Telecommunications, OA

By Robert Batt
CW West Coast Bureau

CHICO, Calif. — It is located in the northern end of California's Central Valley and surrounded by the Coastal Range, the snow-capped volcanic peaks of the Cascade Mountains and the rugged Sierra Nevadas. Not exactly a place where one would expect to find a pioneering center of new technology.

But California State University (CSU) Chico is considered one of the most aggressive schools in the country when it comes to advanced telecommunications and office automation facilities.

Through its microwave Instructional Television Fixed Service (ITFS), the school provides teleconferencing services to university students and commercial clients in a 33,000 square mile radius. Courses such as "Operating Systems Programming," "Systems Architecture" and "Structured Methods in Data Base Management" are provided for students in 15 remote locations who otherwise would have to drive long distances to attend classes.

Hewlett-Packard Co.'s plant at Roseville, near Sacramento, is a regular user of the service. The Police Officer Standards and Training Agency uses ITFS to train its cadets in fighting crime.

In addition to ITFS, CSU Chico has the only completely on-line electronic search and tracking system for public library books in the state university system. Forty terminals manufactured by CL Systems of Newtonville, Mass., are linked to a Digital Equipment Corp. PDP-11/44.

### Office Automation

The university is also keen on office automation. It employs a DEC PDP-11/45 for word processing and recently installed a PDP-11/70 with 64 workstations for electronic mail, spreadsheet analysis and word processing applications.

Graphics is another area in which the school has made a name for itself. It recently received orders from the Ford Foundation and Pacific Gas and Electric Co. to provide digital graphics from its 1,100-line, full-color system manufactured by Dubner Computer Systems, Inc.

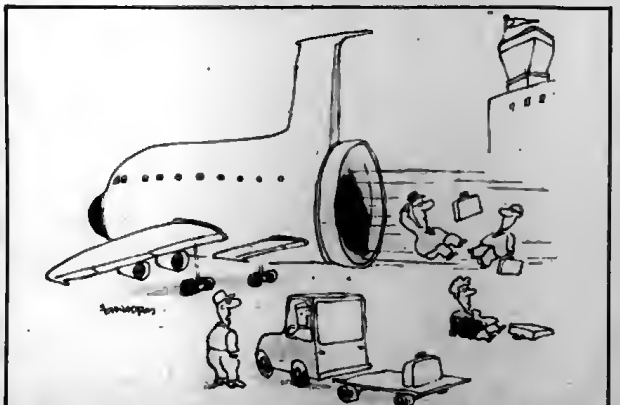
Now the school is embarking on its most ambitious project to date. A 10-meter satellite dish currently being installed on campus will be capable of receiving and transmitting teleconferences and educational services over a wide area. Chico will use the dish this fall to relay U.S. Department of Agriculture and American Library Association conferences to regional centers throughout California.

But Chico's planners are not content to stop there. The school has applied to the National Telecommunications Information Agency (NTIA) for a grant to offer transmitting services on the Scientific Atlanta, Inc.-made satellite. "If we can get this up-link, our aim is to provide educational and teleconferencing services throughout the Pacific Basin. We will essentially be able to transmit to a third of the globe at any one time," explained James May, dean of information services.

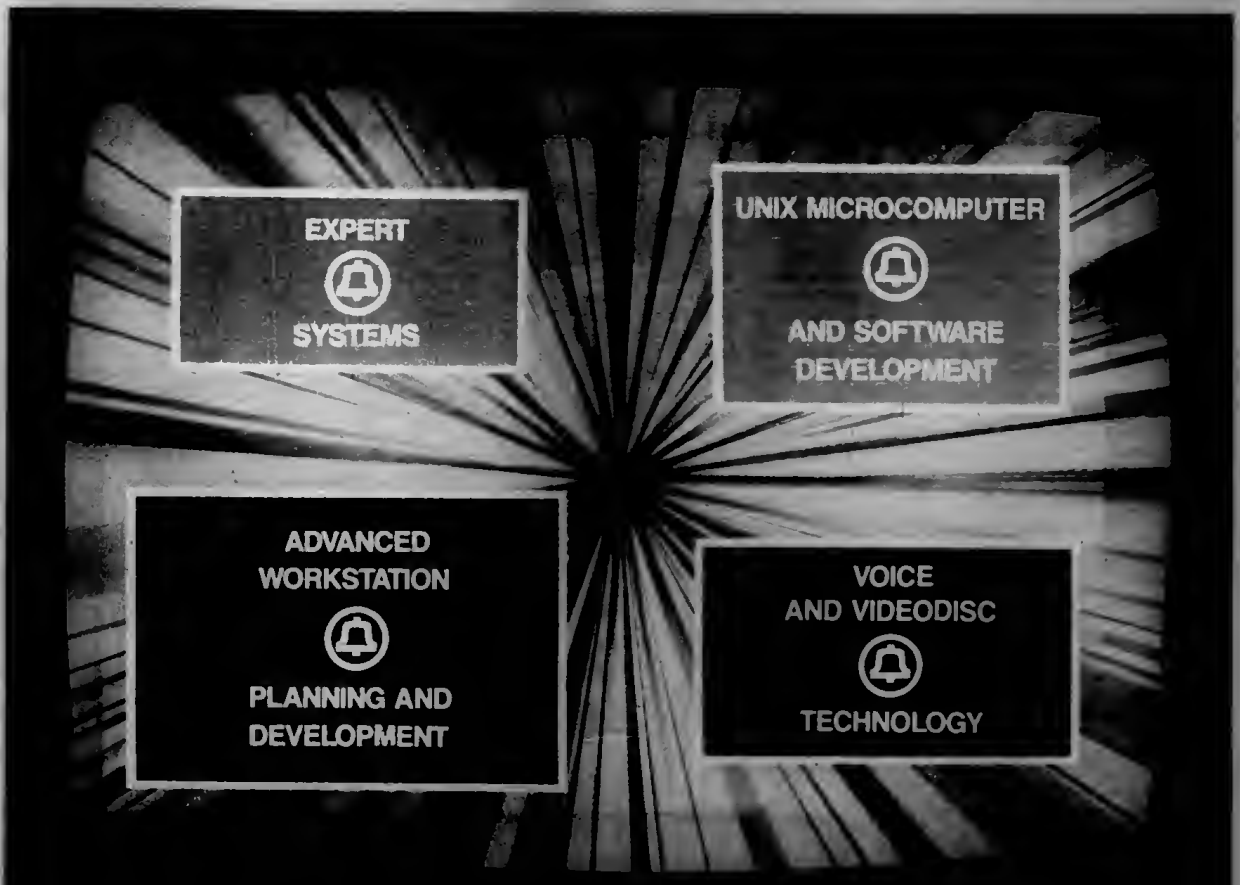
### National Ranking

This year, 3,100 of its students graduated with degrees in computer science, making it the fifth-ranking computer science school in the country, according to a recent survey. A further 1,000 students majored in information science and communications.

At a time when many educational institutions are pessimistic about their services following federal government spending cuts, CSU Chico is decidedly upbeat about its future. Commented Robin Wilson, CSU Chico president recentiy appointed to chair a statewide university commission on telecommunications: "The federal cutbacks actually provide an opportunity for us to go out more and seek the assistance of industry. As a nation, we have a tremendous job to do in training and retraining our people in new technology, particularly with the emergence of a fifth generation of computers. Our facilities will allow us to play a vital role in this effort."



'Yea, Well, the Airline Programmed its Computers to Eliminate Any Overbookings...'




# REACH OUT AND TOUCH TOMORROW

Bell Laboratories

*Students Faced With Myriad Choices*

# System Helps Psychologist Treat 'Student Shock'

By Marguerite Zientara
CW Staff

ENCINO, Calif. — When the technological age officially arrived a decade ago, it brought with it an almost endless choice of emerging and blending careers, as well as career subspecialties.

Faced with myriad choices, many high school and college students started exhibiting what clinical psychologist Mary Anne Rust calls "student shock." Rust defines the syndrome as "a young person's inability to deal with the outside world," an affliction usually characterized by "chronic low self-esteem, anxiety, loneliness, confusion, self-destructive escapism and/or withdrawal back to the family nest."

The founding director of the Success Training Institute here views student shock as different from adolescent "growing-up" disorders in that it strikes not only troubled youths, but also "the sensitive, psychologically well-adjusted student who is neither neurotic nor particularly emotionally disturbed."

But what the computer has wrought, the computer may also put right. Rust has developed a computer-based Student Success Analysis program that reportedly allows her to define a student's talents and personality traits, diagnose emotional systems, identify intellectual capacities and target life and career potentials.

The system is based on three commonly used psychological tests, which together generate 2,000 items of data about each person analyzed. After the data is massaged by two service bureaus and returned, "I have to recalculate everything ... since the raw scores are being used for different reasons than they were originally developed for," Rust observed.

"Once the 2,000 numbers come off these three different computerized systems, I take these puzzle pieces and reintegrate them in various ways so that each person's blueprint really fits that individual person," she explained.

The blueprint is a four-page analysis written by Rust that defines talents, abilities, potentials, directions for overcoming problems and suggested courses for college, career and everyday action.

During an evaluation conference with each subject that is taped, the blueprint is reviewed and explained. Three months later, another private session is held to determine how well the client is following his blueprint. The total cost to the client is $450.

The system, which Rust claims is 95% accurate, could be vastly improved and expanded if it could be computerized on a single system, she said. Rust is looking for someone who can express mathematically the fact that cause and effect in life-styles and careers "will simultaneously be influencing each other.

"If there's some real bright math/computer whiz out there who could help us put this on a computerized system, that would be my dream," Rust said. "Then we could help people nationally and then we could get into even more sophisticated predictions.

"My mind can only handle so much input at a point," she explained. "It takes about three hours of my time even with these numbers to extrapolate the material, project it and — I hate to admit this — there could be some random biasing error, depending on how alert I am, how intuitive I am that day or how much I recall."

Apparently optimistic that computerization can be done, Rust feels computer-based counseling will be "the wave of the future, and I think we're going to see much more sophistication come in as we develop a better way of doing it."

# Prep School Plan Aims at Checking Faculty Flight

ACTON, Mass. — Realizing that competitive high-tech salaries often lure computer specialists away from teaching and fearing that a lack of computer literacy among its faculty was hurting the school's academic reputation, Concord Academy has joined hands with Wang Laboratories, Inc. and Williamson Systems, Inc. in a joint project to make teachers and administrators computer-literate.

"The project was started on the principle that all private schools must have computers for two reasons," explained Concord Academy Headmaster Thomas Wilcox. "They have very bright students who are going to be leaders in business and the professions. And, if schools are to prepare students for successful lives, teachers need to be computer-savvy and need to teach computerese from the very early stages. Having equipment alone is not going to do much if the schools don't have people on board who can write software and know how computers work," he said.

Using Wang's 2200 MVP computer and software developed by Williamson Systems, the school divided its training program into two phases.

The first phase consisted of a 2½-hour computer literacy session where the basic hardware components of the machine and its software were discussed. The second phase was made up of two three-hour classes held daily for three weeks where students had an opportunity to gain hands-on experience at a terminal.

At the program's end, a questionnaire filled out by the 35 participants showed that everyone had become more familiar with computer applications and was ready to apply what they had learned, a Concord Academy representative related.

In addition to making its faculty computer-hip, the 2200 and Williamson software has also helped to zero in more quickly on those students having academic problems.

"[The 2200 and software] has improved our ability to evaluate how students are doing on a more timely basis. For example, we can now key in on a kid having academic difficulty much faster than before when we had to round up all of his teachers and get them together to find out what the problems were," noted Paul Ness, the school's business manager.

Wilcox said he expects the computer to double its alumni gift program because of the system's ability to personalize letters from the school and its class agents. The 2200 is also able to provide follow-up analysis of each donor.

### 'Part of Admissions'

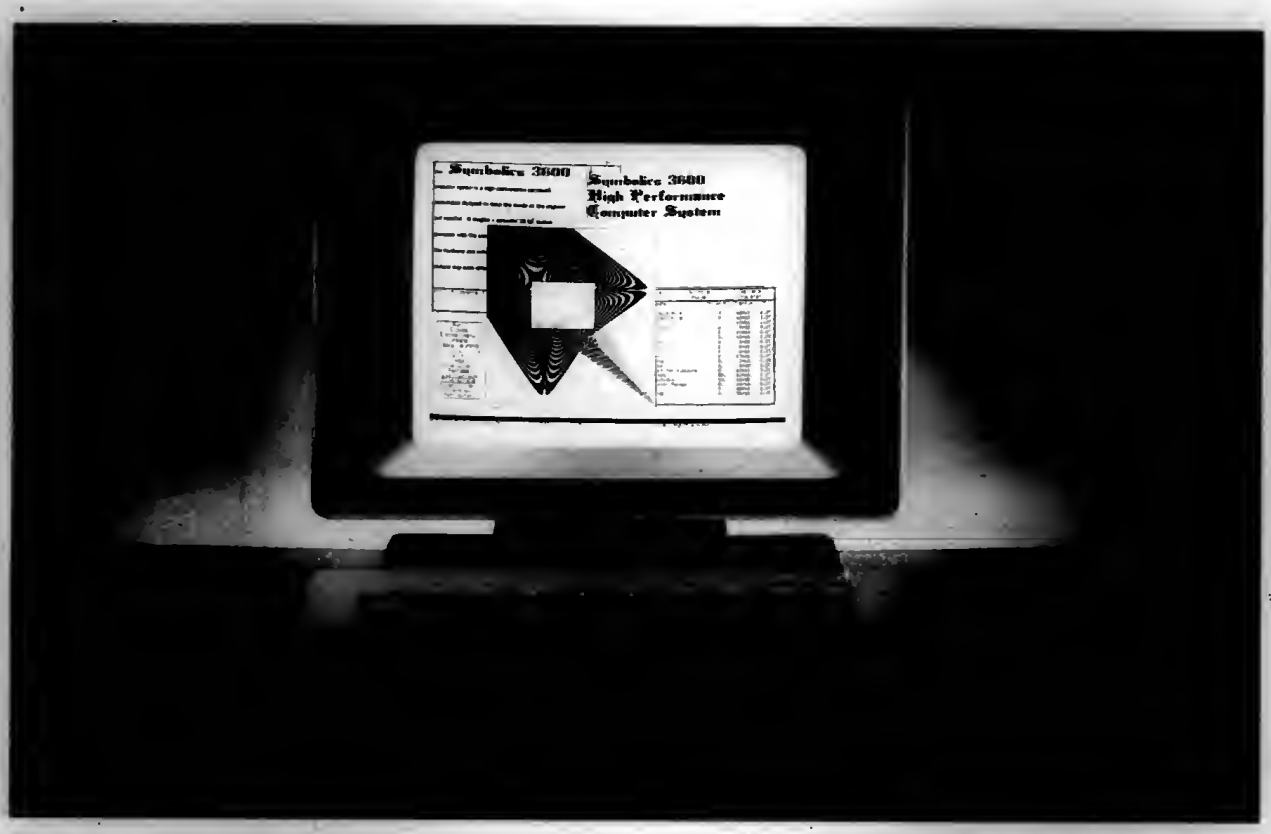
Citing another benefit of the 2200, Wilcox said the system has become an integral part of his school's admissions process. He said counselors can now respond to inquiries and requests on a more personal basis. In the past, the school would mail back catalogs without cover letters or personalized notes.

The computer and its software has also automated the school's business functions. The accounting system automatically writes checks, enters all new data and prints out a complete record of information. This gives the business office financial control measures that allow additional funding allocations to be made to the school's academic programs.

Ness said the system has not resulted in a huge dollar savings for Concord Academy, but then, that was not the point of obtaining the system.

"We really didn't expect ... [to save money]; we are pretty much operating on a break-even basis.

While he has been satisfied with the performance and benefits the 2200 has provided, Ness said that sometime in the future he may replace the minicomputer with a network of microcomputers. "In the future, I don't see a minicomputer; the next generation will probably be micros. In fact, Williamson is now developing packages for micros," he said.

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A new age of computing is here. The Symbolics 3600 Lisp-based processing system suddenly makes large-scale problem-solving simple. It makes the impractical become practical and manageable. With powerful software and hardware, the Symbolics 3600 puts a higher level of computing in your hands. A dedicated, single-user system, the Symbolics 3600 takes the technological advances from the last 25 years of research on artificial intelligence and makes them applicable to real-world, problem-solving applications. To the engineer, designer, scientist and researcher, this offers a new, powerful tool that significantly increases productivity.

Symbolics' innovations in symbolic computing extend the limits of solutions in traditional applications. For example, large-scale software system development and VLSI circuit design are massive undertakings. The Symbolics 3600 software environment takes care of many of the routine tasks a programmer or designer is now required to perform, dramatically reducing programming and design time while significantly increasing productivity. These benefits apply to emerging application areas such as development of expert systems, symbolic mathematics, robotics, CAD/CAM, genetic engineering, training simulators, and a broad range of rasearch activities.

**Symbolics 3600 Specifications**

**System CPU**
36-bit tagged stack-oriented architecture
2-3 megabyte RAM with ECC, expandable to 34 megabytes
1,125 gigabytes virtual memory
20 million byte/second memory bus
Floating point accelerator (optional)

**Console and Keyboard**
Bit-mapped raster display
B&W 17-inch landscape format, 1100 × 800 pixel
88 keys with n-key rollover
3-button mouse
50 KHz sample rate audio output
Color: 1280 × 1024 with 8 to 32 bits/pixel, 10 bits/color RGB (optional)

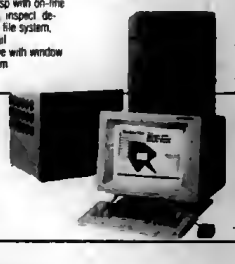
**Mass Storage**
Built-in 159 megabyte Winchester
Optional disk memory up to 1.8 gigabytes
Optional cartridge or 9-track tape drives

**Communications**
10 megabit/second Ethernet local area network
One parallel and three standard serial ports
Autodial/Autoanswer 1200 baud modem (optional)

**Operating System**
Enhanced Zetalisp with on-line edit, compile, inspect, debug, network file system, electronic mail
Totally interactive with window display system

**Languages**
Lisp, FORTRAN-77, C, PASCAL, Interlisp
Flavors object-oriented programming

**Printer**
Laser Graphics Printer LGP-1 (optional)



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The Symbolics 3600 puts the level of computer power associated with supermini class computers in your hands at a fraction of the usual cost. It has a 36-bit tagged architecture and executes programs at an average of one million high-level instructions per second. Our standard 3600 system software, a powerful and proven Lisp-based operating and program development environment, also supports FORTRAN, PASCAL, C, Interlisp compatibility and Flavors object-oriented programming.

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The standard Symbolics 3600 includes full 10 megabit/second Ethernet hardware and software support. An unlimited number of 3600 systems, other computer systems or peripheral devices can be linked together. Each user in a typical workstation environment has access to all other computing facilities on the network.

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The Symbolics 3600 brings to you today a new age of computing—symbolic processing systems that are being used by a growing number of 3600 customers as the sophisticated means for problem-solving. Join them in this new age of computing. Call or write today Symbolics, Inc., 9600 De Soto Avenue, Chatsworth, CA 91311 (213) 998-3600.

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# Computerized Process Adds Color To Black-and-White Film Classics

By Katherine Hafner
CW Staff

TORONTO — Stan Laurel had red hair. But in the early 1930s, when Technicolor was still a glimmer in someone's eye, the lighting people tinged Laurel's hair with green to make it appear darker.

In 1983, artists at Vidcolor Image, Inc. here, a subsidiary of Hollywood, Calif.-based Hal Roach Studios, Inc., decided Laurel's hair shouldn't be red but brown. So brown it is.

Inside the Vidcolor studios, the beginning of a new industry is under way: the conversion of black-and-white films to color.

### System Speeds Process

Using a custom-designed computer system, artists at Vidcolor no longer have to undertake the painstaking and time-consuming method of coloring each frame by hand. The computerized process takes 30 minutes of programming and about 72 hours of lab time.

The $1.5 million project is being financed by HRS Industries, Inc. and Hal Roach Studios, which maintains the rights to some 1,000 black-and-white classics, including Laurel and Hardy films and *The Little Rascals*.

The computerized coloring process begins with the electronic "painting" of the first frame of each movie scene, using a conglomeration of customized hardware and software still in the development stage.

An artist sits before a 25-in. screen on which a grid of 525,000 pixels have been established. Using a light pen and choosing from a palette of 4,096 hues, the artist assigns a color to each pixel, and the selection is encoded into the computer.

### Colors Maintained

For the next frame, the colors of the previous frame are maintained. If a new object appears in the scene — say a piano falling from a tall building — the computer will choose the predominant color in that scene — gray, for example — and make the piano gray. To make the artist aware of the automatic color selection, the piano will flash on the screen.

Currently working with microcomputers, Vidcolor plans to purchase an IBM machine of an unspecified size as yet, according to Wilson Markle, president of Vidcolor.

So far, Vidcolor has colored segments of three Laurel and Hardy films: *County Hospital* (1932), *Busy Bodies* (1933) and *The Fixer Uppers* (1935).

Still in the experimental stage, Vidcolor hopes to be in full production by September, according to Elaine Carlebach, a Vidcolor spokeswoman.

Vidcolor hopes to apply colors that are as exciting and accurate as possible. "We're trying to make [the films] aesthetically pleasing to the eye," Carlebach commented. "We want to give it interesting color and make it as exciting as possible while lending it accuracy."

Carlebach said Vidcolor is already being courted by major film studios and television networks to color and do color testing on their black-and-white films.

# Calendar

**Week of July 10**

July 11-13, New York — **Introduction to Telecommunications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

July 11-15, Seattle — **Information Modeling Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

July 11-15, Dallas — **CICS Command Level Programming.** Contact: Sys-Ed, One Park Ave., New York, N.Y. 10016.

July 11-15, New York — **Project Planning & Control Workshop.** Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

July 11-22, Santa Cruz, Calif. — **Compiler Construction.** Contact: Institute in Computer Science, University of California Extension, Santa Cruz, Calif. 95064.

July 11-28, New York — **CICS Command Level Programming.** Contact: Women in Data Processing, Suite 2008, 310 Madison Ave., New York, N.Y. 10017. Also being held July 11- Aug.10.

July 12, Cary, N.C. — **SAS/Curriculum Workshop.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 12-13, New York — **The Superservice Bureau.** Contact: Lisa Caruso, The Yankee Group, 89 Broad St., Boston, Mass. 02110.

July 12-13, New York — **Microcomputers: Emphasizing Their Uses in Data Communications.** Contact: Micro-Ed, 31 Marshall Drive, Edison, N.J. 08817. Also being given July 13-14 in New York.

July 12-15, Los Angeles — **Software Project Management.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held July 19-22 in Boston.

July 12-15, Toronto — **The USENIX Association Summer Conference.** Contact: Usenix Association, P.O. Box 7, El Cerrito, Calif. 94530.

July 12-15, Los Angeles — **Defining Software Requirements.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held July 19-22 in Washington, D.C.

July 12, 14, 19 and 21, New York — **CICS/VS LOGIC & DEBUGGING.** Contact: Dianne Halper, On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

July 12-15, Boston — **Local-Area Networks.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held July 26-29 in Washington, D.C.

July 12-15, Portland, Ore. —**Structured Requirements Definition.** Contact: Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

July 12-15, Boston — **Computer Graphics.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

July 12-15, Washington, D.C. — **Structured Design & Programming.** Contact: Ruth Dordick, Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held on July 19-22 in San Francisco.

July 12-21, New York — **IDMS Programming.** Contact: Women in Data Processing, Suite 2008, 310 Madison Ave., New York, N.Y. 10017. Also being held July 26-Aug. 4.

July 13-15, Frederick, Md.— **Project Management & the Personal Business Computer.** Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

July 13-15, Chicago — **Fundamentals of Data Processing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

# Calendar

July 13-14, Denver — **Office Automation: Cost Saving Without Disrupting Operations.** Contact: The Seminar Broker, 3212 W. 133 Ave., Broomfield, Colo. 80002.

July 13-15, Arlington, Va. — **SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 13-15, Washington, D.C. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way North, Rockville, Md. 20854.

July 13-15, Washington, D.C. — **Introduction to Statistical Analysis Systems (SAS).** Contact: Registrar, Applied Technology Associates, Inc., Suite 1418, 1710 Goodridge Drive, McLean, Va. 22102.

July 13-15, Boston — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Inc., 11928 N. Earlham, Orange, Calif. 92669. Also being held July 18-20 in Smithtown, N.Y. and July 27-29 in Arlington, Va.

July 13-15, San Francisco —**SAS Basics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

July 13-16, Austin, Texas —**The Third Annual Conference on Technology and Education.** Contact: Conference on Technology and Education, The University of Texas at Austin, Education Building, 310, Austin, Texas 78712.

July 14-15, New York — **Data Communication: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-15, Annapolis, Md. —**How to Audit & Control Computer Systems.** Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

July 14-15, Chicago — **Data Administration: Successful Techniques.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 14-15, New York — **Developing Business DP Systems — A Management Briefing** Contact: Yourdon, Inc., 1133 Avenue of the Americas, New York, N.Y. 10036.

July 14-15, Toronto — **Creative Use of Audit Software.** Contact: MIS Training Institute, Inc., 4 Brewster Road, Framingham, Mass. 01701.

July 14-15, San Francisco —**IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

**Week of July 17**

July 18, San Francisco — **Structured Systems Development.** Contact: Yourdon, Inc., 1133 Avenue of the Americas, New York, N.Y. 10036.

July 18-19, New York — **The Second Annual IBM/Amdahl Users Computer Security Workshop** Contact: Computer Security Institute, 43 Boston Post Road, Northboro, Mass. 01532.

July 18-19, Atlanta — **Data Communication: Advanced Concepts, Products and Services.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 18-19, Washington, D.C. — **Managing Projects in the Structured Environment.** Contact: Yourdon, Inc., 1133 Avenue of the Americas, New York, N.Y. 10036.

July 18-19, Frederick, Md. —**Introduction to VisiCalc.** Contact: Phyllis W. Parrish, Center for Management Development, College of Business and Management, University of Maryland, College Park, Md. 20742.

July 18-20, San Francisco —**Successful Use of Minicomputers.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

# EDITORIAL

## A Silver Lining?

With a sigh of resignation heard round the country, the Treasury Department last week approved a measure to delay by one month the implementation date for the controversial provision of the Tax Equity and Fiscal Responsibility Act that requires banks and corporations to withhold 10% of interest and dividend payments. The action was an acknowledgment by the Reagan administration that it will accept repeal of the withholding measure in exchange for tighter enforcement measures as outlined in a bill filed by Senate Finance Committee Chairman Robert Dole (R-Kan.).

In other words, withholding is probably dead.

A lot of the credit for its demise can go to the banks and financial institutions whose unprecedented mass-mailing campaign turned withholding from an unremarkable issue into a major debate. But ironically, in lobbying against the measure, financial institutions made their DP departments the big losers in the repeal battle.

For DP, the banks' repeal campaign came at a very bad time. While the mass-mailing effort was going on earlier this year, DPers were simultaneously scrambling to ready their software to accommodate the new requirements. In most cases, months of programming time were devoted to preparation, costing money in both programmer salaries and loss of time that could have been spent on more important projects.

In addition, there is no way to measure the human effects of 11th-hour repeal measures. As one DP executive put it, "It's pretty hard to get excited about this project when all the time you're working on it, 50% of the people are telling you it's never going to be employed."

What lesson can DP learn from the debacle? Perhaps it's simply never to trust the Congress and the president, even when they absolutely, positively make up their minds. But a more useful lesson might be to use frequent government regulatory shifts to tackle the irritating maintenance problem.

For all the hassles they cause, these changes afford DP the opportunity to dig into existing software with a chance to document, maintain and improve its efficiency. One DP manager interviewed by *Computerworld* said his operation had used withholding as a vehicle to install new versions of vendor software.

Although the upgrades were not a top-priority project, the manager, nevertheless, was able to find a bright side. "Ninety-eight percent of what we have done so far we will be able to use, regardless of whether the law is repealed," he said.


*Summer Melodrama*

# DATA PAST

### Five Years Ago
### June 26, 1978

WASHINGTON, D.C. — A plan to allow less developed countries access to U.S. data banks with the costs of the terminal facilities and global communications links underwritten by the U.S. was under study by the State Department.

— — —

WHITE PLAINS, N.Y. — Some users of IBM 360-age equipment had their minimum monthly maintenance charges raised, while users of some 370 equipment received a reduction.

### Ten Years Ago
### June 27, 1973

NEW YORK — The Justice Department asked Judge David Edelstein to impose stiff civil and criminal penalties against IBM if it continued to refuse to turn over documents for its antitrust suit.

— — —

PARK RIDGE, Ill. — A total of 852 candidates passed the 1973 examination for the Certificate of Data Processing. The 852 who passed all five sections of the exam represented approximately 31% of the 2,722 who took the test.

# LETTERS

## Crying Wolf

*Computerworld* is crying wolf in the editorial "Putting an End to Big Brother" [CW, May 30], which covers proposals to add Secret Service suspects to the computerized National Crime Information Center (NCIC) of the Federal Bureau of Investigation.

If every proposal for enhancing computerized files is met with dire warnings about George Orwell and Big Brother, then people will be anesthetized and lose interest in distinguishing serious threats from less serious threats.

The current Secret Service proposal involves adding to NCIC files about 125 names of persons thought to be threats to the president. There has been no "creation by the FBI of an electronic surveillance system," as *Computerworld* writes. This is hardly worse, as *Computerworld* says, than current proposals for national identity cards to be required of all job applicants. Those proposals deserve *Computerworld*'s scrutiny far more than the Secret Service/FBI plan.

Besides, can Congress really claim that this plan needs legislative approval when NCIC has been operating under congressional appropriations since 1967? This is not the first time NCIC will include the names of persons never accused of a crime. In 1975, at the urging of Congress, but without any formal approval, the FBI added missing persons to NCIC. Just about all of the 25,000 citizens have not been involved in wrongdoing. Isn't this more threatening than the Secret Service plan to add a couple of hundred names to NCIC? Just a year ago, Congress authorized by statute the addition of several thousand missing children to NCIC which, after all, is supposed to be a center of criminal information. Can Congress now seriously tell the FBI that adding the names of Secret Service suspects is improper?

It would be more appropriate to scrutinize the merits of the Secret Service/FBI plan. First, the information to be entered into the system is generally agreed to be of marginal use. Second, there is no way that the information can "help the Secret Service track the whereabouts and activities of those it has judged possibly dangerous": There is no system yet that can do that. What this plan will do is permit the cop on the beat to get a computerized "hit" from NCIC in the unlikely event that he will encounter one of the couple of hundred suspects in circumstances in which there was no probable cause of criminal activity.

Third, *Computerworld* should be asking, "Does this plan address the problem that it was supposed to resolve?" The original problem was that a potential assassin, John Hinckley Jr., got through a weapons check at a Tennessee airport, when he should have been stopped, just days before he went to Washington, D.C., and shot President Reagan. Government people, especially those in law enforcement, tend to react to an embarrassment like that by proposing the creation of something new, usually a computerized system, to leave the impression that if only they had that something new originally, the embarrassment would not have occurred. The Secret Service/FBI plan does not address the Hinckley problem. Congress should force the Secret Service, the FBI and local police to concentrate on the relevant question: How could a person like Hinckley be allowed through an airport checkpoint with a weapon? Can NCIC or Secret Service files management be improved to prevent this?

Robert Ellis Smith
Publisher

Privacy Journal
Washington, D.C.

LECHT ON SCIENCE/Charles P. Lecht

# Systems Technology: An Emerging Simplicity

Could it be that our old friend the CPU is being stripped of its central rank? Downgraded even so far as to share the unprepossessing status of the peripheral? Remember the days when CPU status really counted for something? When the relationship of the CPU to other computer system constituents found a human echo in the attitude that IBM 7094 people might have harbored toward IBM 1401 people, something loosely akin to the self-satisfaction Henry Higgins might have felt on first contemplating his Eliza Doolittle project? Well, this has all ended. And with it, the notions of copy, simulation and emulation are also demoted, if not altogether disgraced.

There was a time when a copy was, well, a copy. A second computer produced by IBM did as it was intended to do, namely, it simulated the first computer from its chassis right down to its chips. This second computer was at once a simulation and a copy, but "copy" embraced the meaning of "simulation." Anyway, we didn't go around saying that we'd just bought a perfect simulation of, for example, IBM's 4341; rather, we said that we had obtained a copy.

If a second company produced a 4341 look-alike, we were tempted to say that it was a copy (lawyers litigating questions of patent infringement are especially susceptible to this temptation), but we usually lost confidence in the wholesale applicability of the term and generally wound up modifying our use of the word "copy" by saying something to the effect that it did essentially everything the 4341 did. By this we meant that the second machine acted upon its input in such a way as to replicate the 4341 processing scenario.

This procedure signaled the coming of age of CPU distribution and prefigured today's CPU-as-peripheral phenomenon. As the products we acquired diverged into design from the original, but continued to maintain such user-level functionality as may be found in 4341 processing, we were quite understandably inclined to abandon the descriptor-noun "copy" and turn to "simulation," "emulation" or some combination of both in its stead.

For example, certain Hitachi Ltd./National Advanced Systems, Inc. systems are not, in the purest sense, copies, but hybrid combinations of simulation and emulation technologies (at least on their usage levels) of IBM machines; they accept the same inputs, produce the same outputs, but do what is necessary in different ways.

In the past, some performance degradation took place in almost any simulation/emulation stew, today, however, this need not be the case. With the cost of million instructions per second power becoming an ever less significant factor in the cost of modern systems, manufacturers are increasingly disposed to speed up otherwise degraded machine performance by distributing large-scale integration boosters where and as needed.

### New Scenario

The need to simulate and/or emulate processing of one machine's operations on another is now being supplanted by a new CPU-peripheral attachment scenario, one previously reserved for such things as printers, tapes, disks and other appurtenances. As these traditional peripheral devices became increasingly intelligent, enough so that their circuit boards were replaced by CPUs of increasing intelligence, their chips were seen as CPUs in their own right. With peripheral CPU control conjured into being, it was only natural to produce them to enable operation of an instruction repertoire written by the user and different from the one residing in the first processor he purchased. While not entirely new, this CPU adjoining as an attachable user plug-in is an ever-expanding phenomenon. It defines the advent of a time when portable program and data problems will be overcome.

For example, an IBM Personal Computer with a Quadram Corp. Quadlink board provides users of the system with an Apple Computer, Inc. instruction set totally compatible with certain versions of Apple systems. It invokes emulation at the disk, printer and tube to complete the picture. The effect is that the system can read an Apple program and its associated data in a form acceptable to the Apple and produce essentially the same results.

The IBM Personal Computer/Quadlink combo could, of course, be followed by Radio Shack's TRS-80, Texas Instruments, Inc., Commodore Business Machines, Inc. and Atari Corp. adjoinings — why not? The Japanese fifth-generation plan (not yet realized) points the way. No slouches when it comes to identifying and exploiting a trend, especially where that trend encompasses a more effective approach to the conservation of resources, the Japanese are ingeniously creating systems that anticipate the day when such compatibilities will have come to be assumed in the never-ending race for marketplace share.

Compatibility among all machines, whether through simulation and/or emulation and/or adjoining of CPU-peripherals will be achieved in dramatically different ways in our electronic future. Just as there is an endless set of programs operable on one machine, there will be an endless variety of machines that can run the same programs and achieve the same results, where "same" is broadened to include the time of operation, ease, usability and so on. This will ultimately result in our being liberated from the toil and drudgery of program/data conversion and provide the occasion for great merriment and general thanksgiving among users.

This will be followed by our abandonment of all of our synthetic languages, with the exception of those resembling the languages that now form an integral part of our tradition — those pre-computer-age languages that arose through our perceived necessity to communicate, manipulate and otherwise deal with abstractions, plus our natural languages.

The former will continue to be needed because computer systems are incapable of creating, processing and yielding results in the abstract world. Quite beautiful by any standard of measurement, our pre-computer-era languages (like algebra) for dealing with abstract thought emerged through the ages as the result of a continuous process of collective refinement by human genius. Their profound and ornamental elaborations, symbols and logical structures rival any other inventions of man, material or otherwise. So I do not see computer systems technology

*(Continued on Page 48)*

HUMAN CONNECTION/Jack Stone‡

# Micro Success Depends on Infrastructure

The growing disaffection of businessmen with micros is, in one sense, simply a testimonial to the historical recurrence of the familiar pattern of acceptance — and rejection — of computers on the part of new users: high hopes that are later dashed by systems realities, followed by sobering truths about what is practical and achievable and then, finally, the sunny days of serious productivity.

Richard Anthony, general manager and chief executive officer of Norstar Communications, part of the St. Louis-based Broadmoor Group, suggests that reasons underlying this problem can be found in contrasting key attributes of mainframes and micro systems:

"Here are some comparisons that may not be self-evident:

● "For 35 years, the data processing establishment has developed a considerable body of expertise, procedures and lore regarding the accurate and timely processing of data. Data entry, verification and editing, processing deadlines, data security and backup all follow well-established procedures and are practiced by individuals who are held accountable for the results.

*This is the second of a three-part series on "The Coming Crisis in Business Microcomputers."*

"However, pocket calculators and microcomputers are not associated with such a body of procedures. The accuracy of the information they provide dependa upon the rigor with which they are used.

● "Mainframe and mini vendors have a wide repertoire of customer support, training, installation assistance and implementation expertise. They seek to increase trade by maintaining long-term customer relations.

"Those who merchandise calculators and micros know full well that advertising, and not service, sells their product lines. They have only a spotty history of support, customer training or implementation assistance, certainly when compared with the services of other vendors.

● "Data processing equipment is standardized, or at least generally compatible; it is acquired and applied according to a long-range plan.

"Pocket calculators and, often, microcomputers are purchased with petty cash or without serious technical review. They vary widely in model and manufacture and are generally incompatible.

● "Computers are used for what I term 'data processing,' that is, the gathering and rendering of data into formats that meet the requirements of the organization. Specific departments accept total organizational responsibility for the accuracy, dispersal and use of this information.

"Calculators, and often microcomputers, are used for what I term 'information processing,' that is, the rendering of data into formats meeting the requirements of the individual. The accuracy and use of this information is subject to the discretion and judgment of the individual.

● "Computers run large applications software programs, either developed internally or in the form of modified packages that have been adapted to meet user needs. The DP staff that supports this software is composed of systems analysts and coders adept in high-level business languages and job control language

"Pocket calculators and microcomputers come with preprogrammed packages for working spreadsheets, financial formulas and scientific calculations. If anyone supports these, he is an instructor.

"The implication of my analysis is that businesses cannot treat microcomputers as a mainframe-horse of a different color. My point is that microcomputers can and will play an important role in the office of the future; but to capture their potential benefit, a firm must acquire a procedural, support and organizational infrastructure that is not now part of the microprocessor tradition. Failure to build such an infrastructure inevitably leads to user frustration and disenchantment — or even worse, it has the potential for precipitating serious organizational crises."

# Metamorphosis of DP Systems Technology

(Continued from Page 47)

profoundly altering, say, basic algebra, except to bring it and its computer-acceptable incarnations (for example, Fortran, Basic, Pascal and so on) closer together.

### Nontraditional Lingos

The nontraditional synthetic lingos like Cobol are giving way to natural languages. These will do the job much faster than most people now believe they can.

English phrases occurring in IBM's Query-By-Example environment are embryonic forms of our natural language. Their disjointed, uneven user facilities begin to look more and more like faithful reflections of our typical businessman's camel-gaited progress through his typical business day: a few words, the filling out of forms, obtaining various kinds of data punctuated by coffee breaks and a call from school to say that his child is being expelled and could he please drop everything and come immediately.

Thus, Cobol and all its verbose relatives — the hybrids like Ada, and even techniques that are supposed to change our most basic, nonprocedural inclinations, like structured programming with its tentacularly extended families — will be short-lived. And all the rest of our formal attempts to reduce and contain via symbol or structure what we would otherwise, and in other ways, deal with through natural languages or behavior will ultimately be superseded by just that — facilities that do not presuppose that we are machines.

No wonder attempts at standardization of the truly synihetic languages for business has produced only idealized sets of symbols and rules; the number of variations on their standards actually implemented seems endless. Thus, it should come as no surprise that the limited target of syntax and rules represented by the Cobol standard has achieved such a paltry measure of success in terms of the universe of Cobol compiiers and their precise implementation. What will be surprising is that implementation of the English language will not suffer the same fate, even though the scope of its complexity is much wider.

But I forecast that this will happen; it is a development to which the emergence of new fast processors and large fast memories is lending irresistible momentum. For the linguistic purists who are shocked by the apparent sweep of this forecast, I offer not the English of our dreams, but the very limited, often disjunct, number of words and phrases of accounting, along with its pictures, as an example of things to come.

When our natural ways of expressing and doing things fall increasingly within the ambit of our machines, all the computer systems we use to accomplish data processing will appear to converge, as if they were all the same devices, with the apparent differences in what they can do dwindling unto the vanishing point. Only size, speed, added-value synthetic intelligence and connectability to the network will remain to distinguish one system from the next, all other facets of their physical operations environment being essentially equal.

And when this day comes, our technology will no longer be subject to the limitations that affect our ability to develop applications today. Programs will be transportable and operable virtually everywhere. Rewriting applications will become commonplace and entail little difficulty. Little or no training in the technology will be required by its users. No time will be wasted creating and maintaining computer facilities; their hardware and software will become as transparent to problem solution as is our telephone network to communications. And with this, we will be able to focus our scientific talents, the same talents that brought us the chip, on the challenges of living.

*Lecht is president of Lecht Sciences, Inc., a New York-based think tank specializing in computer and communications technologies.*

# LETTERS

## Unscientific Claims

*Computerworld*'s readers should be provided with some perspective regarding the views expressed by Charles P. Lecht in "DP Lawyers: Hessians of U.S. Tech Revolution" [CW, May 16]. I am an honors graduate of the University of California at Los Angeles in mathematics/computer science, with 19 years of experience as a data processing manager, systems analyst, systems programmer, computer operator and customer engineer.

I am also a practicing attorney, a member of the Board of Directors of the Computer Law Association, a member of the American Bar Association Section of Science and Technology and a Practicing Law Institute lecturer on computers and law.

There are thousands of lawyers in this country with similar credentials, many hundreds of whom have chosen to practice in the area of high technology precisely because of their backgrounds and experience in engineering, data processing, technology and science.

These lawyers are dedicated to exploring and dealing with the legal issues unique to an exciting new field — issues that arise out of the interaction of intelligent, aggressive people engaged in honest and serious competition in new and, as Lecht points out, uncharted business, legal and scientific territory.

The scientific waves of change wash onto the shore of legal and business reality a large number of difficult, unanticipated and unsolved problems.

High-tech lawyers devote many long hours to the task of understanding these problems and to developing among themselves, through various specialized bar associations and with their clients, solutions to the problems.

Such thorny and diverse issues as the protection of intellectual property rights in computer programs, the preservation of traditional human values in conjunction with basic genetic and behavioral research, the bringing to justice of so-called computer criminals, the sorting out of property and other legal rights among users of outer space and dozens of others that have the potential to affect all of us and that certainly affect those who function at the forefront of technology must be addressed, and solutions to them must be found.

Of course, all of these solutions must also be compatible in form with our American system of law and jurisprudence, a constraint that makes the work of these professionals and their clients at once more challenging and more frustrating.

Lecht has apparently had some bitter experience with some lawyers while earning his expert-witness fees; the throes of litigation are not without bitterness.

But Lecht's blanket indictment of the legal profession, his impugning of the integrity of all lawyers in one sweeping sentence and his ridiculing of the technical and scientific experience of lawyers generally are, well, to say the least, unscientific.

Paul Bent
Attorney at Law
Long Beach, Calif.

## Give Them a Boost

After reading the article "What to Do When a Subordinate Is Not Qualified for Promotion?" [CW, May 2], I felt that I had to write.

I find it appalling that managers are more determined to hold their subordinates down than they are to develop them and give them a boost.

Very seldom is an employee so incompetent that he is incapable of being promoted. In many cases, what the employee is lacking is education and training. However, only one of the managers surveyed offered any type of training to employees.

Managers complain about the loss of productivity and lack of work ethic among their employees, but don't seem to stop to think that if they want loyalty, they must give some loyalty.

Could it be that it is the managers who are incompetent rather than the employees?

Carolyn Landry
Lawson Associates
Minneapolis, Minn.

# At last, help for companies wrestling with the problems created by personal computers.

"Overrun."
"Invaded."
"Swamped."

DP managers use a variety of terms to describe the arrival of so many different personal computers on the business scene. But the *feeling* is always the same.

After all, most managers have spent *years* developing well-controlled information systems. Now, almost overnight, they are losing control.

And while there's no arguing that PCs are valuable tools for individual productivity, everyone would prefer a more integrated approach for the company.

What's needed is a system that combines corporate data base capability with the personal computer capabilities employees now insist upon. A system with the capacity to extend the functionality of the corporate network to the individual local level. This is exactly what Honeywell has built.

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The cost-efficient microSystem 6/10 is a multi-personality workstation that provides an impressive range of functions – including networking.

Besides personal computing, the system handles data processing and word processing. It can function as a network end-point and a terminal emulator. What's more, power and flexibility make the microSystem 6/10 perfect for adaptation to industry-specific applications.

The microSystem 6/10 helps ensure organizational unity through excellent communications – it talks to IBM mainframes as readily as to our own.

It also offers expandable hardware and our time-proven GCOS operating system, which is compatible across the entire range of Honeywell minicomputer products, including even the most powerful 32-bit systems. This compatibility assures easy progress along your growth path by eliminating the need to re-create applications and retrain personnel.

**Fight fire with fire.**

Best of all, perhaps, the microSystem 6/10 will be an immediate hit with employees wed to their PCs. Because it accepts popular software packages based on CP/M-86® and MS-DOS,® chances are your people won't have to give up their favorite programs.

The microSystem 6/10.

Here's the way to win the battle against "PC Pandemonium."

And the war for control.

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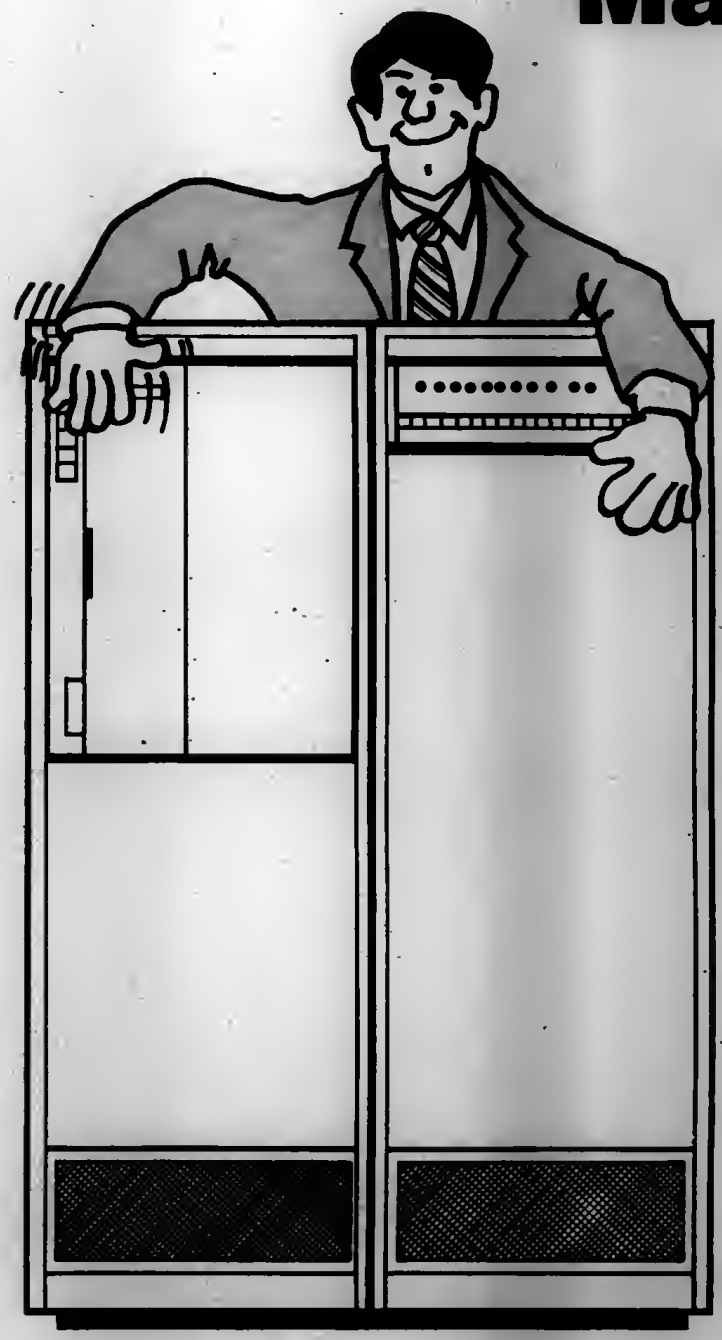
# The Everlasting Mainframes



## *How Large Computers Survive DDP*

**By Donald R. Powell**

The campaigns of the small-computer "revolution" have been highly publicized over the last few years, from the traditional 16-bit minicomputer to the supermini, the personal computer and the supermicro. Much less documented, but in many respects equally dramatic — and certainly with as much long-term significance — has been the remarkable resilience of the large mainframe.

A few years ago, a new direction in computing technology was heralded: Distributed data processing using powerful minicomputers was about to turn the conventional DP world upside down. Given the prevailing mood among users, the future of the large-scale mainframe looked uncertain. However, structural forces already at work in the industry by 1976 would substantially alter the course of the DDP revolution.

The huge installed base of large computers and the investments in software to run them were important moderating influences. Users could not readily convert their applications to small systems, no matter how attractive, thus creating great demand for improved large systems. In addition, few DP organizations could accept the loss of control over their function that many advocates of DDP suggested. Nor could DP countenance the duplication of effort that resulted from unregulated small-computer deployment.

Early attempts at replacing large-scale systems with small ones resulted, in most cases, in many smaller management problems replacing one big one. It turned out that most of the problems of managing computers were intrinsic to the technology and not the result of overcentralization, as had been widely suggested.

Of even more significance, however, was that for the first time in years, there was some real competition in the large-system market. Traditionally, users were so committed to the architecture of their installed systems that there was little competition between vendors. The advent of the plug-compatible CPU manufacturers dramatically changed that environment. Amdahl Corp. made its first volume shipments in 1976 and by the end of

*(Continued on In Depth/3)*

IN DEPTH

# How DDP Proponents Saw the Industry

The DDP revolution appeared to be in full swing by 1976. One could not read a trade magazine or attend a conference without hearing another prediction that DDP was the wave of the future.

Even more exciting, the development of the microcomputer was then just on the horizon; it was widely expected to further the revolution by providing an individual computer for every end user. Before long, DDP advocates explained, those huge, obsolete, centralized mainframes would be replaced by economical, efficient mini- and microcomputers, and those elitist computer "experts" would be cast out of their raised-floor silicon towers.

It was widely argued in the industry that most data processing problems resulted from excessive centralization and the use of ineffective large-scale computers.

In particular, it was frequently suggested that large systems were much too inefficient, expensive and unreliable for interactive operation, which was clearly of paramount importance to the industry's future.

### Justifying Small Systems

In some cases, organizations used the perceived trend to smaller systems, by itself, as justification for acquiring minicomputers, regardless of any objective evaluation of alternatives.

In other cases, users bought small systems in order to circumvent the normal budgetary controls which were (quite correctly) applied to the centralized computer services. In some organizations, advocates of moderation in the race to join the DDP stampede were looked on as a little backward.

There was, in fact, considerable evidence to support these ideas. The predominant large-scale system in use in 1976 was the IBM 370/168. The 168 was only 30% more powerful than the 370/165, which had been introduced in 1970, and the cost of the two systems was nearly the same in most configurations. Thus, the hardware price/performance levels of large computers improved only marginally during the early 1970s. In addition, several mainframe vendors introduced virtual storage features during this period. Support for virtual storage enhanced the functional capabilities of the large systems but, in some cases, resulted in significantly higher overhead.

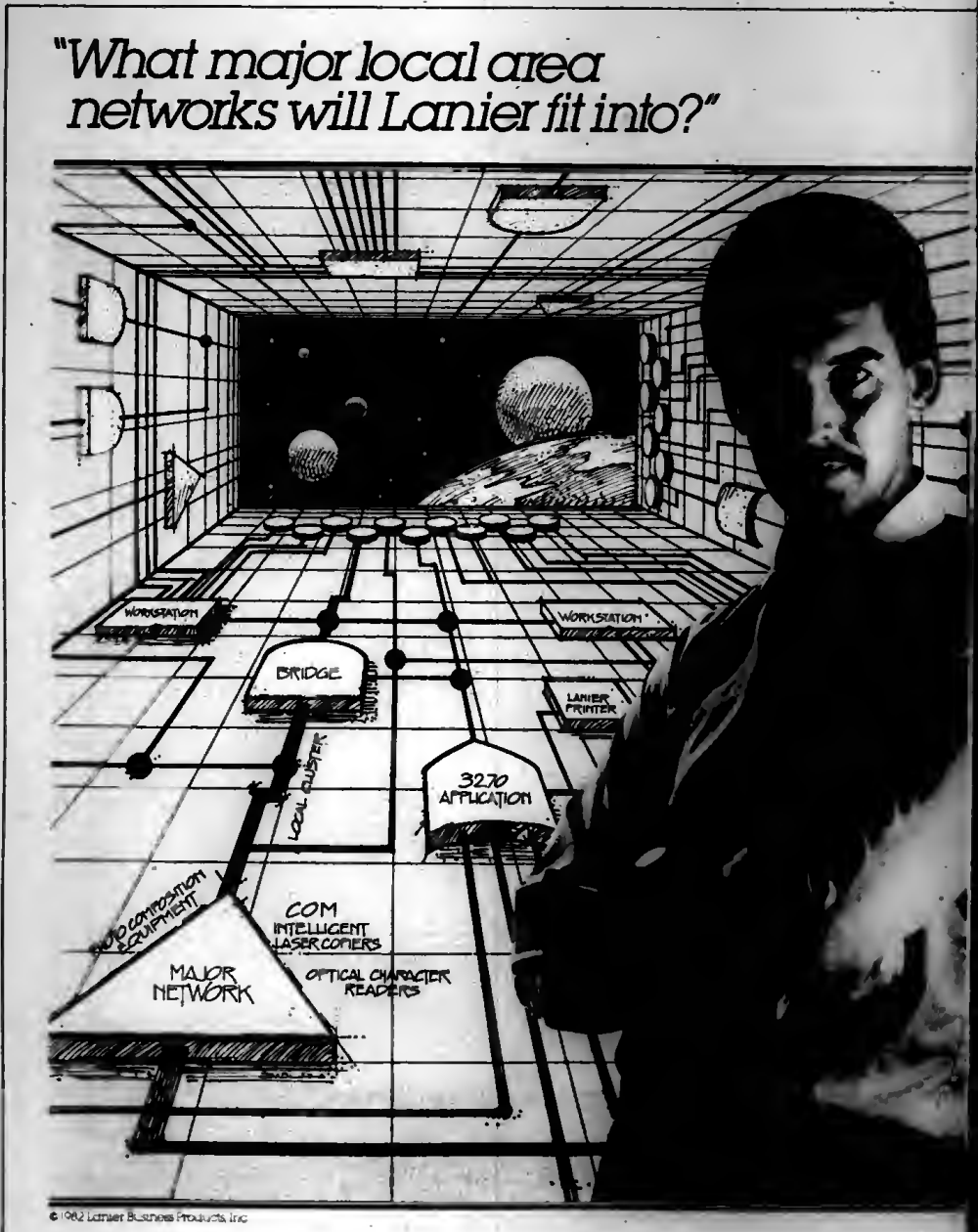
For example, the CPU resources required to support a given interactive work load doubled between IBM's real storage operating system, OS/MVT, and its virtual storage successor, OS/VS2, Release 2.

The result of these factors was that large-system users suffered a net reduction in performance levels during the six years of 1970 to 1976. During this same period, minicomputer technology had made great strides in improved performance, reduced price and enhanced software capabilities.

These small systems had become powerful enough to be seriously considered for many significant applications.

Moreover, it was widely suggested that small systems were evolving rapidly, while large-system evolution had stagnated.

For all these reasons, the future of the large-scale mainframe in the emerging world of DDP looked problematic to some in the mid-'70s. However, mainframe industry forces would soon begin to alter the course of distributed processing, ensuring the continued dominance of large computer systems.



# EVERLASTING MAINFRAMES

IN DEPTH

*(Continued from In Depth/1)*
the year had achieved significant market impact. These first Amdahl systems clearly showed that major innovations in performance, price and technology were possible in the production of large computers.

In addition, it was obvious that the Japanese computer manufacturers would soon be in a position to exploit the same advanced technology as Amdahl.

IBM responded quickly to the new level of competition. In 1977, it introduced the 3033, which provided twice the performance of the 370/168 at about the same price. This announcement brought to light a startling fact: There was indeed elasticity of demand in the market for large computers.

Previously, it had been assumed that this market size was determined by the basic requirements of the small number of very large organizations and was thus quite stable. The overwhelming flood of orders for the 3033 showed that this was not the case: at lower prices, a much larger volume of systems would be sold, allowing, in turn, even lower prices. Elasticity in the marketplace had been assumed for years in pricing minicomputer systems, resulting in low unit prices, and the recognition of elasticity as a factor in the large-system market was a fundamental change in the way these computers were produced and priced.

| Year | System | Mips | Dollars per Mips |
|---|---|---|---|
| 1970 | 370/165 | 1.8 | $2,475,000 |
| 1976 | 370/168 | 2.5 | $2,240,000 |
| 1982 | 3081K | 14.0 | $ 315,000 |

**Table 1. Hardware Evolution**

The cycle of lower prices and higher volumes was repeated several times during subsequent years as IBM made frequent price reductions and product announcements. Each IBM announcement was followed closely by equivalent announcements from Amdahl and National Advanced Systems, Inc. (NAS), the other two competitors in the market for large 370-type computers. In late 1981, IBM introduced the 3081K, a system with nearly six times the processing power of a 168, at a lower price than the older machine.

Table 1 traces the hardware evolution of large systems since 1970 in terms of millions of instructions per second (Mips) and "dollars per Mips," which is the purchase price of the CPU, memory and channels, divided by the number of Mips. Throughout this discussion, Mips is considered to be based on commercial mixed work loads, with the 370 instruction set. Scientific work loads or different instruction sets and architectures can produce Mips rates that vary by factors of two, three or more for systems with equal throughput.

Table 1 shows the two distinct periods of large-system evolution: negligible change between 1970 and 1976, followed by dramatic improvements between 1976 and 1982. Both Amdahl and NAS now offer systems larger than the 3081K, with equivalent or better levels of price/performance, and several Japanese manufacturers are selling highly competitive systems, some as fast as 50 Mips. Most other mainframe vendors (notably Control Data Corp. and Sperry Corp.) have also introduced powerful new large systems that are fully competitive with the 3081.

The advent of the plug-compatible vendors brought about the competitive pressure for improved hardware, but in addition, user demand and IBM's need for additional revenue sources in the face of falling hardware prices combined to spur the development of more efficient large-system software. In 1977, along with the 3033 announcement, IBM introduced a substantially improved, independentiy priced version of its primary operating system for large CPUs, MVS (Multiple Virtual Storage). MVS/SE provided significant performance improvements over the "public-domain" version of MVS,

IN DEPTH

particularly in interactive environments. In 1981, another MVS version (MVS/SP 1.3) again improved performance, also with emphasis on interactive work. These improvements have been brought about by redesign and recoding of many MVS components and, in some cases, by microcode assists.

TSO (The Time Sharing Option), a subsystem of MVS, is the most widely used time-sharing software on large computers. It is in use on about 70% of large 370-type systems, according to a recent survey by International Data Corp.

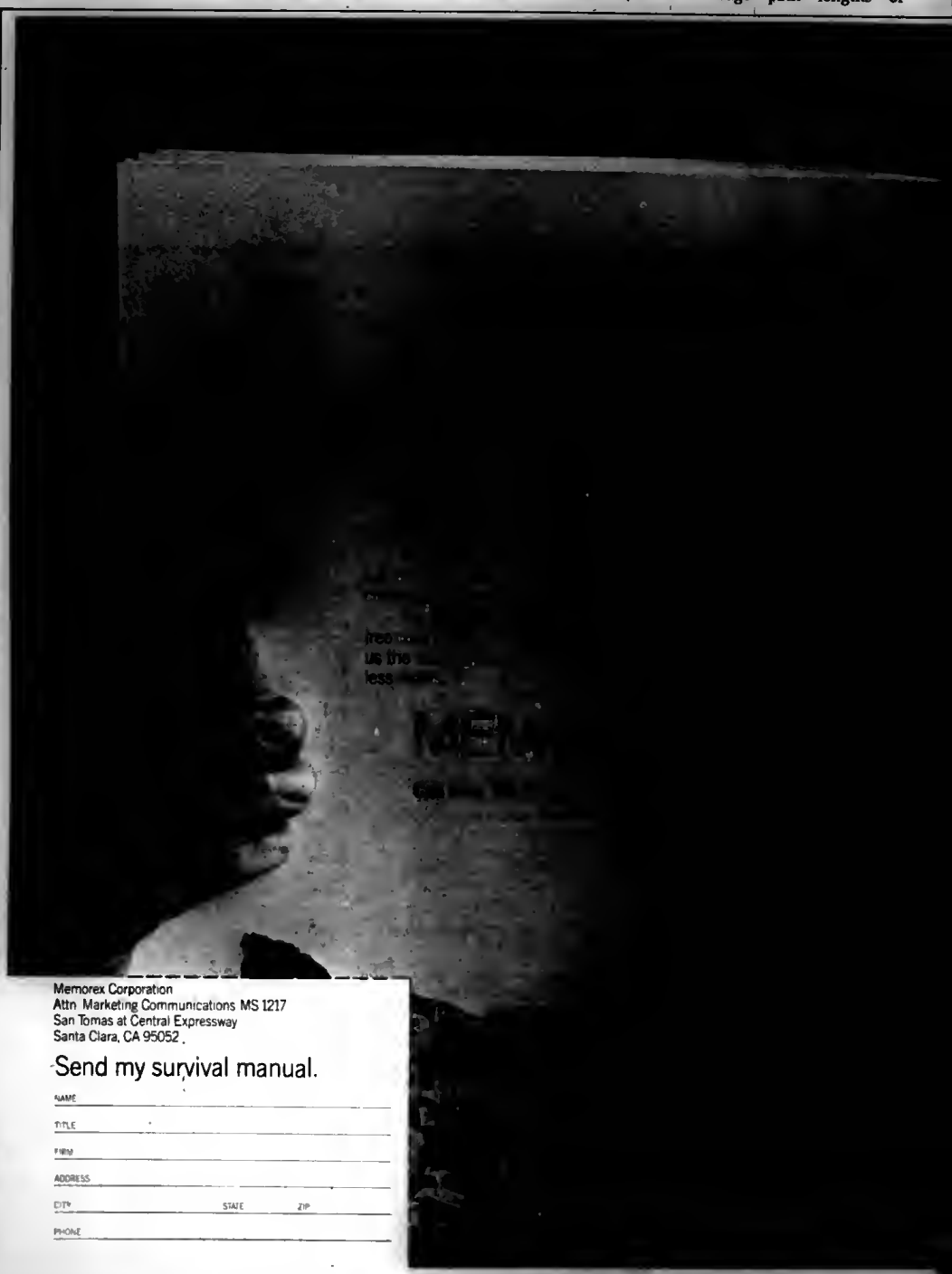
Table 2 (on In Depth/6) is an attempt to quantify the performance impact of operating system evolution since 1970. The table shows the "path length" (number of CPU instructions required) per transaction for an average TSO work load in a business environment. The work load is assumed to consist of interactive program development, application execution and general time-sharing functions in a variety of computer languages. Also shown is the nominal capacity of a 2.5-Mips processor (the approximate speed of a 370/168 or 3033S), expressed as the maximum number of concurrent terminal users that could be supported, assuming that the CPU is the limiting resource in the configuration. The performance shown in Table 2 for MVS/SP Version 2 is an estimate only, based on design changes that have been announced.

The capacities shown in Table 2 assume very active terminal users and a moderately heavy work load. Care should be exercised in comparing these numbers with other environments, particularly in using the number of terminal users supported, by itself as a measure of system efficiency, a common mistake. One of the main goals of interactive system designers is to reduce the number of users supported on a given hardware configuration by providing facilities that are powerful and easy to use, thereby allowing users to express their work requirements as quickly as possible.

Restrictive designs can reduce the load per user, but do not necessarily increase system efficiency. Only if expected work load, available facilities, terminal activity rate and system response time are held constant (as has been done in Table 2) is the number of concurrent users a meaningful measure of system performance.

General-purpose operating systems typically exhibit average path lengths of





# EVERLASTING MAINFRAMES

IN DEPTH

300,000 to 500,000 instructions per time-sharing transaction for commercial work loads. The most efficient operating systems dedicated to time-sharing are normally in the lower part of the range, while more generalized, portable operating systems are usually near the high end. There is little evidence to support the frequently voiced opinion that small-computer operating systems are generally more efficient than the equivalent large-system software.

The impact of the various stages of large-computer software evolution can clearly be seen from Table 2. In particular, the increase in CPU path lengths resulting from virtual storage operation is evident during the early 1970s. Since 1976, the additional cost of virtual storage has gradually been eliminated; the current MVS version is now twice as efficient in interactive environments as the pre-1976 software and nearly three times more efficient than the initial release of MVS. And other large-system vendors as well as IBM have reoriented their systems software for more effective interactive operation. As a result, interactive use of large computers is increasing industrywide by more than 50% per year.

The combined impact of improved software and more cost-effective hardware has been a dramatic reduction in the hardware costs of interactive processing on mainframes. The reduction, of course, excludes support costs, which have risen with inflation and are now substantially larger than hardware costs for all computers, large and small.

To quantify the impact of recent large-system evolution, the purchase price of the hardware needed to support one interactive workstation has been estimated and is shown in Table 3 (on In Depth/8). It has been assumed in this table that no more than half the workstations would be in use simultaneously, based on a ratio of one workstation per two computer users, with 1.5 hours of use per user per day, with allowance for peaks. Three costs are shown in Table 3: CPU costs, which include the costs of the central processor, main memory and I/O channels; system costs, which include CPU costs (as above), along with 20 million characters of on-line storage per workstation, access to high-speed tapes and printers and basic operating system costs; and full workstation costs, which include the previous costs along with a display terminal with full-screen capability and communications control function.

Table 3 shows that between 1976 and 1982, CPU costs per workstation on mainframe systems have declined by a factor of 14 and full workstation costs by a factor of 7. In monthly terms, the hardware-related costs for interactive computer use now represent less than 10% of the salary and overhead expenses associated with a typical computer user, and many large organizations now plan to provide personal workstations for each user.

At current prices, large systems can usually provide

IN DEPTH

| Year | System | Path Length | Users per 2.5 Mips |
|---|---|---|---|
| 1970 | OS/MVT | 420,000 | 110 |
| 1972 | OS/VS2, Release 1 | 700,000 | 65 |
| 1974 | OS/MVS, 2.0 | 975,000 | 45 |
| 1975 | MVS 3.0 | 800,000 | 60 |
| 1976 | MVS 3.7 | 600,000 | 75 |
| 1977 | MVS/SE 1.0 | 450,000 | 100 |
| 1980 | MVS/SP 1.3 | 390,000 | 115 |
| 1982 | MVS/SP V2, TSO "E" | 375,000 | 120 |

**Table 2. Software Evolution**

interactive facilities at the same cost or less than other system alternatives, even in dedicated interactive environments. In addition, modern mainframe systems are much more effective than small computers in support of mixed work loads consisting of both batch and interactive processing. Mixed work loads allow for significant further economies. The peak loads experienced by interactive systems typically last for only a short period, so dedicated interactive machines cannot normally use more than 20% of the capacity of a given processor on a 24-hour basis. Computers supporting mixed work loads often achieve utilization levels of 60% or more, resulting in much lower unit costs for all types of work.

In a mixed work-load environment, the CPU costs of supporting time-shared operation of large mainframes — a matter of concern only a few years ago — can be as low as $40 per month per workstation, or about 1.5% of the salary of a typical programmer or other computer user. With plug-compatible hardware and limited-function terminals, full workstation costs can be as low as $3,600.

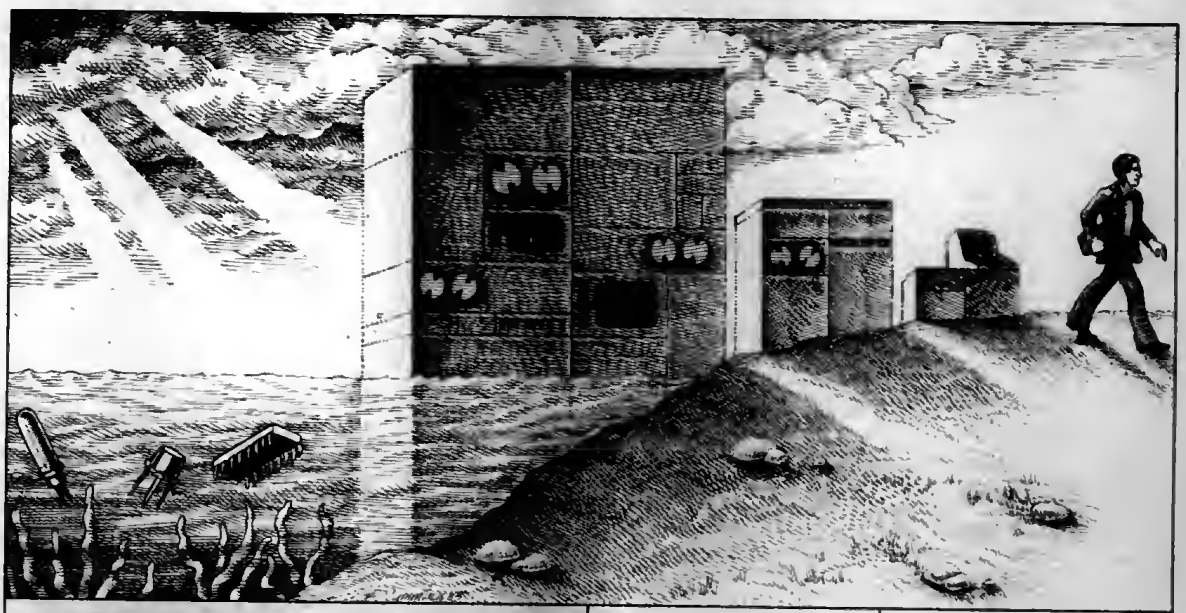
Although there are no longer economies of scale related to CPU processing, such economies remain in the unit costs of on-line storage, other peripheral equipment, software and support costs. On-line storage, for example, is two to four times less expensive on a large mainframe than on a minicomputer and 10 to 100 times less expensive than on a microcomputer. In many applications, this single cost is the most important to be considered.

The same ratios are evident in software costs. For example, the price of a full-function data base management system is typically 1% to 2% of the hardware cost of a large mainframe, 5% to 15% of the cost of a minicomputer and 20% or more of the cost of a microcomputer. This factor will become an increasingly important in system selection in the years ahead.

Also of increasing significance, but often overlooked, is the cost of hardware maintenance. Annual maintenance as a percentage of purchase price is typically 3% to 5% for large mainframes, 7% to 9% for minicomputers and 11% to 13% for microcomputers. Over a five-year useful life, this maintenance increases the effective cost of ownership of a microcomputer by 60% or more and a minicomputer by 40%, while the equivalent figure for a mainframe is only 20%.

As a result of these and other factors, most proposed DDP configurations are still not economically attractive unless substantial savings in communications costs are possible. It is not necessarily true, as sometimes assumed, that DDP will always reduce communications costs. If most required computer use is within reasonable physical proximity, communications costs and overheads will actually increase with most implementations of DDP.

For example, the widely discussed architecture of local microcomputers as workstations for interactive processing in mainframe-hosted networks can result in such high volumes of file transfers between processors that communications overheads are greatly increased. In addition, there is often little savings



# COMPUTERS MUST CHANGE.

The evolution from vacuum tubes to transistors to microchips has spawned a series of stunning successes for computers—from the mainframe to the mini to the micro. Not since the introduction of the telephone has a piece of equipment made such a positive impact on the workings of business.

Yet, in today's business, a substantial workforce has been largely overlooked by the computer industry: the mobile professional.

They are the executives, salespeople and field-support personnel that spend many of their workdays doing battle against the competition away from their desks—far from the comforts, conveniences and computing aids of the home office.

### THE HAZARDS OF THE ROAD.

The mobile professional spends hours on planes, trains and in taxis traveling to business meetings. Only to have to return at a later date with the typed contract. Or mail in the revised report. Or call back with the final numbers.

Office automation simply hasn't moved fast enough for the mobile professional.

Between paper, pencils, pens, files, triplicate carbon copy order pads, calculators, dictation recorders, appointment diaries, phone books and a picture of the twins, the mobile professional charges off dragging half an office across thousands of miles of territory every year.

### SOMETHING, INDEED, MUST CHANGE.

Clearly, what's needed is a viable alternative. A mobile computer designed specifically for the rigors of the road.

Taking the thinking professional's approach, we believe a mobile computer has to be a powerful and complete ultraportable. One that fits easily inside a briefcase. And runs on rechargeable, self-contained batteries for use en route as well as in the office or at home.

It stands to reason that it must have an adequately large display screen, a full-sized keyboard, a correspondence-quality 8½" x 11" or legal page printer and microfloppy disk drives for memory.

Necessity would also suggest an integrated modem, for two-way data communication via standard telephone lines.

All in a package that weighs in at less than 14 pounds.

### THE HARDEST PART IS THE SOFTWARE.

But by far, the most important feature of a truly useful mobile computer is its software. It has to be fully confusion-proof, using familiar graphic symbols, rather than complicated computer-talk, to guide the user through each step.

It also has to offer a full complement of practical application programs, including a personal secretary, word processing and financial planning. Developed precisely for the professional demands of the mobile professional.

These are the criteria by which we've designed the Gavilan™ mobile computer. In fact, Gavilan is committed exclusively to taking the computer evolution to its next logical step.

Because, yes, computers have come a long way. But change they must.

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IN DEPTH

| Year | System | CPU Costs | System Costs | Workstation Costs |
|---|---|---|---|---|
| *Environment: dedicated interactive work load* | | | | |
| 1976 | IBM 370/168 | $49,000 | $52,900 | $58,900 |
| 1982 | IBM 3083E | $ 3,500 | $ 5,700 | $ 7,700 |
| *Environment: mixed batch/interactive work load* | | | | |
| 1982 | IBM 3083E | $ 1,300 | $ 2,600 | $ 4,600 |
| *Environment: mixed work load, PCM hardware, limited-function terminal* | | | | |
| 1982 | Amdahl 5850 | $ 1,000 | $ 2,300 | $ 3,600 |

Table 3. Large-System Cost per Workstation

in required host capacity as compared with performing all processing entirely within the host.

Along with the low unit costs of current large systems computing, they continue to have many functional and performance advantages over smaller machines. For example, most small systems have significant limitations on the total on-line storage that can be attached. A 3081-class computer would normally have access to 60 billion to 80 billion characters of on-line storage, with expansion to hundreds of billions of characters possible. By comparison, even the largest minicomputers can support only a few billion characters and microcomputers only a few million.

In many environments, these restrictions can significantly reduce the effectiveness of the smaller systems. Even if 60 billion characters of storage could be included in a network of small computers, the cost of the on-line storage alone in such an environment would usually exceed the complete hardware cost (including CPU, memory and peripherals) of a large system with equivalent capacity.

In many applications, response time can also be far better on a big mainframe than on smaller machines. A Basic benchmark, performing a moderate amount of processing or data manipulation, might require 60 seconds of processing time (and also response time) on a dedicated microcomputer. This benchmark might need 3 seconds of CPU time on a supermini and would typically receive 5 to 10 seconds response time on a time-shared system. On a 3081-class machine, such a benchmark would require only one-tenth of a second of processor time and should normally receive almost immediate response.

While it might be generally accepted that large systems can today provide some of the previously outlined advantages, it is often asserted that future small systems will eventually reduce or eliminate these advantages, since the rate of small-computer evolution is so rapid.

It is worth looking at this assertion in more detail, by comparing recent experience in the mainframe industry with that in the minicomputer industry. In 1976, two of the leading minicomputer systems were the Digital Equipment Corp. PDP-11/70 and the Hewlett-Packard Co. HP 3000 Series II. The current successors to these systems, the VAX-11/780 and the HP 3000 Series 44, provide up to twice the CPU performance of the older machines at about the same price.

This nearly two-to-one improvement, while impressive in itself, has clearly not kept pace with the advances in the mainframe industry, where price/performance ratios have

# Before you buy a printer look at the fine print.

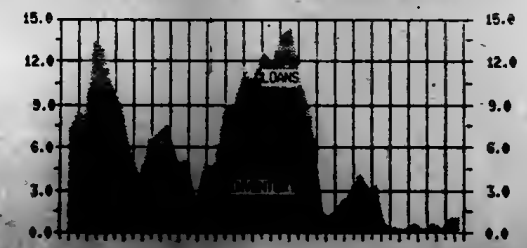
There's a big difference in printers, and the proof is right before your eyes.

This is an actual printout from Digital's Letterprinter 100. As you can see, it's good enough to send out to customers.

But that's not all the Letterprinter 100 can do. Suppose, for instance, you're in a hurry.

JUST PUSH A BUTTON AND YOU CAN PRINT OUT A WHOLE PAGE OF DRAFT COPY IN LESS THAN TEN SECONDS.

There are other fine points. You can see how the Letterprinter 100 can print multiple typefaces. It can also print in BOLD, **double-width** and condensed. And do all these styles automatically, without stopping. And with its wide range of graphics capabilities, you can even draw your own conclusions.

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... the fine print, see our fine printers. ... f... ...stributor near ...

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IN DEPTH

**(A) Processing Capacity**

| Year | Installed Mips |
|---|---|
| 1976 | 1,884 |
| 1977 | 2,685 |
| 1978 | 4,230 |
| 1979 | 7,507 |
| 1980 | 11,034 |
| 1981 | 15,052 |
| 1982 | 19,789 |

**(B) Interactive Workstations**

| Year | Time-Sharing | Transaction Processing | Total Workstations |
|---|---|---|---|
| 1976 | 50,000 | 35,000 | 85,000 |
| 1982 | 850,000 | 625,000 | 1,475,000 |

**Table 4. Large-System Installed Capacity (370-Type Only)**

improved by a factor of at least six in the same time period. There is no evidence to support the view that small-system evolution is, or will be, more rapid than that for large systems.

### Marketplace Verdict

Technical achievements by themselves are, of course, of little value; the real measure of any product is determined by the marketplace. In 1976, there was already a substantial installed base of large systems, which many predicted would gradually be replaced by smaller machines. In fact, nothing of the kind has occurred: the response of the marketplace to the new generations of mainframes has been overwhelmingly positive.

Table 4, derived from historical large-system population figures published by International Data Corp., outlines the approximate worldwide installed capacity of large-scale, 370-type computer systems. (A large system is considered to be a 370/165 class machine or larger.)

Table 4 clearly shows that there is little evidence to suggest any trend toward replacement or "offloading" of these large mainframes. On the contrary, the installed base has expanded enormously, with more than 10 times the installed capacity at the start of 1982, relative to 1976. Interactive use has grown even faster; Table 4B indicates that the total number of interactive workstations supported by large systems increased by a factor of nearly 20 in the same six-year period. In addition, shipments of large 370-type systems are expected to exceed 10,000 Mips per year during 1982 and 1983 as volume shipments of the 3081-generation machines begin.

Growth in the market for large computers is not restricted to commercial systems. In the last few years, Cray Research, Inc. and Control Data Corp. have created an entirely new market for high-speed parallel processors for scientific applications. This market is also thriving and allowing the implementation of many new applications that would be completely impractical on smaller computers.

Despite the record of continued large-system market growth, industry analysts often suggest that this market is a low-growth, "mature" segment of the industry. There appear to be several reasons for this misconception. First, the percentage growth of various industry segments is frequently used as the only measure of the strength of that segment. Clearly, it is unreasonable to compare the $18 billion-per-year mainframe industry with the $3 billion-per-year microcomputer industry (based on 1981 shipments) on this basis; growth of "only" 10% in the mainframe market is more in absolute dollar terms than even 50% growth in the microcomputer market. Moreover, growth rates invariably fall as any industry gets larger, as witnessed by the minicomputer industry, which has seen its growth rate fall from 35% to 10% or less as it has grown in size (although it remains less than one-third the size of the mainframe market). Even with infinite demand, it is simply not practical for a $20 billion-per-year industry to expand revenues 50% annually.

Second, the unit price erosion of mainframes has been severe in recent years. As a result, growth in the dollar volume of shipments has been slower than the growth in Mips, although the value of large systems shipped is now more than double the 1977 levels. The small-system market has had far greater price stability and has thus experienced revenue growth almost in line with increases in shipments, giving that

market a high apparent growth rate relative to the mainframe market.

Finally, all mainframes are often grouped together as a single market segment, even though they span more than two orders of magnitude in price and performance. Smaller mainframes, once the largest part of the computer industry, have been relatively unsuccessful during recent years. Prior to the introduction of the IBM 4300 class of machines in 1979, smaller mainframes were not price-competitive with the equivalent minicomputers and, in some cases, were functionally deficient as well. Even today, for example, IBM lacks an integrated, full-function operating system for its smallest mainframes (excluding System/38).

As a result of these factors, there was no growth at all in the market for small mainframes (in the 370/138 and 148 range) between 1975 and 1980, according to IDC's 1981 *Review & Forecast*. Grouping all mainframes together as a single market segment suggests a lower growth rate for the larger systems than has actually occurred.

Careful analysis of large-system capacity installed, as presented in Table 4, clearly indicates that the market for large mainframes continues to be one of the most rapidly expanding industry segments.

Another source of confusion is that the extent and impact of the implementation of distributed processing are often overstated, particularly in the trade press. As with any popular medium, the trade papers naturally emphasize anything new and unusual; a large user installing a third or fourth 3081 is hardly newsworthy, while the same user acquiring a few minicomputers or microcomputers is often considered worthy of extensive analysis and comment, simply because it continues to be a relatively unusual event.

Also, much of the material in the trade papers is generated by those with a vested interest in selling some product or service, and since there are a great many organizations attempting to profit from small computers and relatively few producing large computers, there is a preponderance of published material advocating small computer use.

According to a recent *Fortune* survey, only about 20% of large-system users implemented distributed processing applications (involving remote processors and data bases) between 1976 and 1980. And of even this 20%, about half indicated that their next major hardware upgrade would be to the central site, rather than at remote sites.

These figures suggest that it is rare for distributed processing to be implemented as an alternative to centralized processing. Distributed applications are normally additions to existing large systems when specific applications merit this design, and they frequently result in increased, rather than decreased, central site capacity.

***'According to a recent Fortune survey, only about 20% of large-system users implemented distributed processing applications (involving remote processors and data bases) between 1976 and 1980.'***

There has been so little substance behind most of the furor about distributed processing that even IBM may have misjudged the market. In 1979, IBM introduced the 8100 system, designed from the ground up as a distributed processor. This system is often considered a failure in the marketplace, primarily because the market for true distributed processing (cooperative, linked processors) is much smaller than once expected, and there is no indication that this situation will soon change.

Certainly, there is no available evidence to support the view that there is a long-term, historical trend

# When users rated their co
# guess which name came

# mputers' communications, through loud and clear?

## Hewlett-Packard HP3000

Data Decisions, an independent research firm, surveyed users of business computer systems from the major suppliers. When the 3,042 responses were tallied, the award for Best Overall Performance in Data Communications went to Hewlett-Packard's HP 3000 computer family.

We were pleased, but not surprised. And neither were the thousands of HP customers who for years have relied on our networks.

As a pioneer in distributed processing, HP long ago took on the challenge of creating reliable data communications that were also easy to use.

Today, HP/DSN (Distributed Systems Network) is used to tie business and technical computers together in a company-wide information network. We've developed local area networks (LAN), so workstations can share data bases and peripherals. In addition, we provide links to IBM's SNA.

While we believe in a flexible approach to communications, we're also firmly committed to standards. Our systems implement X.25 packet switching, and we've just introduced DSN/PBX, which can save you a bundle on installation costs by using existing phone lines for local networks. And we worked with the IEEE committee to develop the 802.3 LAN standard that will help to make datacomm more uniform for everyone.

In everything we do, we're committed to making communications easy to install and easy to use. For instance, we can have a network up and running in just two days.

So if you want to communicate better, call your local HP sales office and ask a Business Computer Specialist about all our networking capabilities. Or write to Hewlett-Packard, Attn: Tom Rappath, Dept. 03181, 19447 Pruneridge Avenue, Cupertino, CA 95014. In Europe contact: Henk van Lammeren, Hewlett-Packard Nederland B.V., Dept. 03181, P.O. Box 529, 1180 AM Amstelveen, The Netherlands.

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IN DEPTH

toward replacing large mainframes with distributed small computers.

Today, it is relatively rare to hear industry experts announce the imminent demise of the large mainframe, although there is a lingering suspicion in some minds that this will eventually come to pass.

In summary, a review of industry trends leads to the following conclusions:

- Large mainframe computers continue to be the almost universally preferred alternative for large organizations; large systems enforce standardization, allow better management control of the corporate information assets, minimize duplication of effort and, as a result, make the best use of the most critical DP resource — skilled manpower.
- Distributed processing represents a significant advance in system design methodology if geographic and application characteristics are appropriate. It is usually an ineffective approach for providing general computing capabilities in large, single-location organizations. True DDP almost always increases the complexity of any given application.
- In most environments, large systems provide generally lower cost computing than multiple small systems. In addition, they allow far larger applications to be processed easily and efficiently and allow nondisruptive growth of individual applications.
- In many cases, distributed processing is being implemented with small versions of the larger systems. A small mainframe can often provide many powerful and cost-effective networking and distributed processing features, while also providing exact compatibility with large host systems.
- Current large systems will continue gradually to add layers of function and areas of application. Large-computer operating systems are often criticized for excessive complexity and lack of the "elegant simplicity" which so delights the academic purists, but economic commitments to these systems are so enormous — in excess of $150 billion invested in MVS applications alone — that wholesale replacement by completely new software is both impractical and undesirable. The evolutionary process for large operating systems is, in many respects, quite similar to that of the human brain, which also consists of multiple layers of progressively higher level functions. That most harsh and impartial critic, natural selection, has already determined the wisdom and necessity of such an evolutionary path.
- The integrated processing environments supported by current large systems, consisting of facilities for batch, time-sharing and transaction processing, will continue to be a requirement for the foreseeable future. Although batch processing is now relatively less important than in the past, it continues to be the preferred mode of operation for jobs requiring long running times, large volumes of output or human intervention

IN DEPTH

for such activities as mounting tape or disk volumes. Batch is also the least expensive mode of operation for repetitive "production" work. Full integration between processing modes, including file and program compatibility, results in a conceptually and operationally simpler environment, lower overall costs and higher organizational productivity.

- Small systems can provide significant benefits as centralized processing tools for small organizations. In most cases, the use of several smaller computers would not be considered if a single larger one could be used. Any small business that allowed individual employees to acquire any desired computing equipment would not be in business for long.
- Small-system vendors are rapidly introducing larger versions of their successful minicomputers. HP is now marketing the HP 3000 Series 64, and DEC, the VAX-11/782. These systems both use 32-bit words and offer processing power in the range of the 370/158, which, only a few years ago, was considered a large "centralized" system.

These powerful systems provide a reasonable growth path for current minicomputer users, since installing multiple small minis is not an acceptable alternative for most users. At the same time, mainframe architectures are being implemented on much less expensive hardware. The "370 on a chip" will arrive within a year or two, allowing the acceptance of industry-standard architectures at all levels of the industry.

- The industry forces that have produced the recent rapid evolution of the large computer will continue for at least the next few years. These forces include intense competition, the rise of the Japanese manufacturers, market elasticity and advances in microelectronics technology.

From a philosophical standpoint, there seem to be two essentially opposing trends that will determine the course of the computer industry over the next few years. One is the increasing desire of many individuals to control their own computing environments.

This trend will lead to some acceptance of "personal" microcomputers in large organizations, particularly those without tight financial controls.

The feelings of personal ownership engendered by these small machines, and the involvement in the details of computer operation that they allow are sources of significant appeal to many potential computer users. Indeed, this is an underlying, though usually unspoken, consideration in much of the discussion about distributed processing. Many people simply enjoy being involved in acquiring and operating computer systems, with as much involvement in technical detail as possible.

However, it is far from certain that there will be a favorable long-term return on investment from corporate expenditures on "personal" applications and systems, particularly when the required functions can often be

IN DEPTH

made available more economically with larger systems that would facilitate sharing of any results achieved. Moreover, it remains to be seen just how much organizational computing can really be construed as "personal."

A number of management concerns result from the proliferation of personal computers in large organizations; among them, fragmentation of corporate information resources, duplication of effort and the potential lack of integrity and complete lack of security of data stored on floppy disks. Also of concern is the possibility that expenditures on microcomputers will lead corporate management to believe that further expansion of centralized systems is not required. In fact, the applications practical on personal computers are so simple and their effective capacity so small that this would rarely be the case.

This same phenomenon following minicomputer acquisitions has caused serious problems in some organizations in past years. In some cases, these acquisitions were viewed as an alternative to central system expansion, with the result that critical centralized corporate applications were jeopardized by inadequate mainframe capacity.

In spite of any abstract or theoretical advantages of decentralization — and despite the ideological and religious fervor that a desire for decentralization can ignite — everyday business practicalities will continue to dictate a substantial degree of corporate control over information gathering and processing activities. These activities consume inordinate amounts of human and other resources if not managed appropriately. The need for efficient information processing leads directly to the second fundamental trend driving the computer industry in this decade: centralized information resource management.

Centralized control of the data processing function does not mean that end users of all kinds should be denied access to appropriate computing tools, only that these tools should be made available in a way that will most benefit the overall organization — which usually means use of shared, centralized services. There is no question that many DP departments have been remiss in not promoting the direct use of computing throughout their organizations and in not providing sufficient capacity to support such use. Insufficient central-site capacity often leads to pressure for tactical decentralization, even though this might not be an appropriate strategic direction.

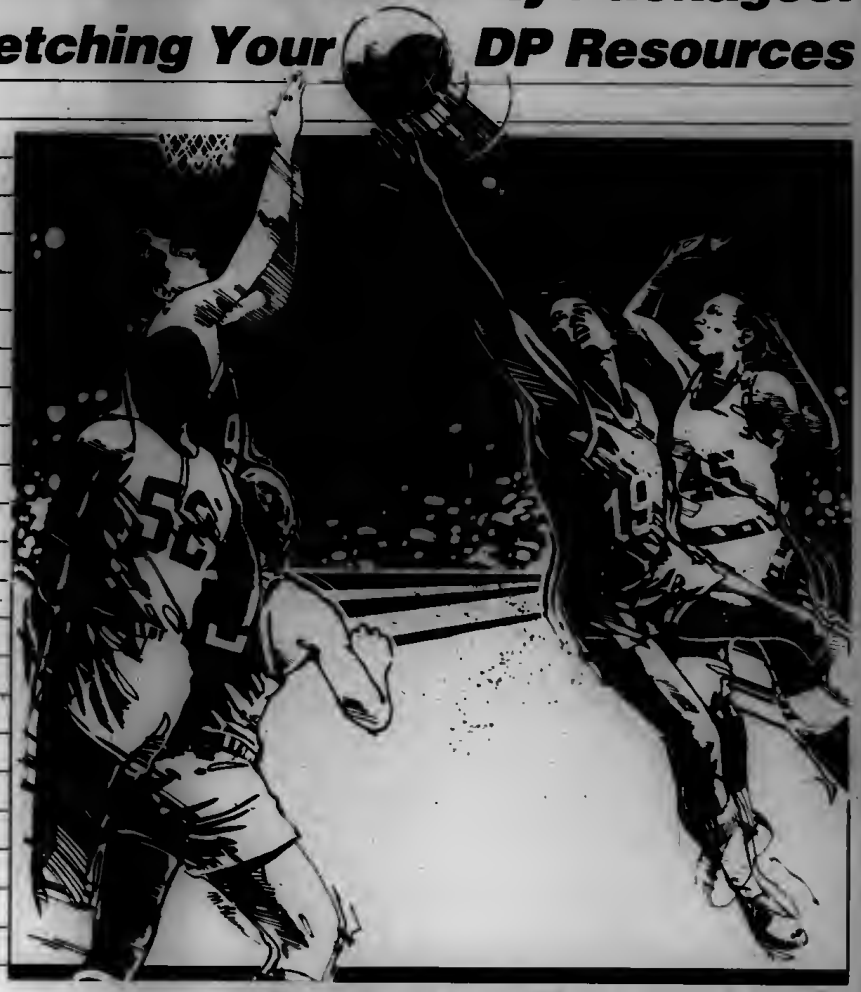
In a sense, the ability to centralize, control and therefore share knowledge and tools as "community property" has been one of the most important factors in the cultural evolution of mankind and is no less a requirement in the computer age than any other. The need for control and sharing of resources will lead to ever larger and more powerful central computing facilities.

### About the Author

*Donald Powell is manager, system performance, in the Ottawa Systemcenter of Datacrown, Inc., a large Canadian service bureau with computer centers in Toronto, Ottawa and Silver Spring, Md.*

# SPECIAL REPORT

## Software Productivity Packages: Stretching Your DP Resources



Edited by Paul Gillin and Lois Paul

June 27, 1983

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

*One Answer: Application Generators*

# Untangling the Programmer Productivity Maze

By Merle Parks
Special to CW‡

Data processing can have a dramatic effect on business productivity. But unless the DP industry can improve its own productivity, it will not be able to solve business productivity problems.

The current trend is to measure productivity in the DP department by the number of lines of code generated. Unfortunately, little or no attention is paid to the quality of the DP output or to whether this additional code serves the needs of the company.

The solution is not more code, but better code in the form of results that make better use of the company's facilities and impact favorably on the bottom line. People are the company's greatest investment, and the best return on that investment is to provide ways to leverage their creative abilities.

So why not just hire more people? The best reason is that qualified people are nowhere to be found. Even if they could be found, the cost of hiring, training and absorbing turnover might not be the most cost-effective solution, especially in terms of productivity.

A better investment is to spend the money on tools that will make the current staff more productive. The proper software, when used effectively, can result in major improvements in productivity without adding to the staff or to the collection of hardware. But the key phrase is "when used effectively."

It has been said that programmers spend only 24% of their time writing new applications and the balance doing maintenance on applications, systems and conversions. With all this attention to maintenance, the new applications backlog grows worse, costs go up and the return on investment is virtually nonexistent.

*'The proper software, when used effectively, can result in major improvements in productivity without adding to the staff or to the collection of hardware. But the key phrase is "when used effectively." '*

Surprisingly, only 7% of maintenance involves coding errors. The majority, 83% in fact, involves faulty design or specifications. DP, therefore, must design and implement systems that accomplish their intended tasks quickly and efficiently, without lengthy maintenance.

One of the common problem areas in the DP organization is the so-called "on-line" environment, which is not really on-line because of the process used to create new systems. We might enter a program on-line, but by the time we wait for a compile, wait for a printout, wait for table entries or wait for test times, much time has been wasted. This is the classic "hurry up-and-wait" syndrome.

Some DP organizations will attempt to solve the problem by assigning multiple tasks to the programmer. With one program in the test atage, another in the coding stage and another in design, the programmer always has something to do while waiting for each task to be completed.

This multitasking is similar to running a computer in a multitasking mode. In the case of the comput-

*(Continued on SR/4)*

# Utility Reduces DL/1 Dumps, Frustrations for Insurance Firm

PHILADELPHIA — The number of IBM DL/1 dumps it was forced to do and the frustrations it encountered prompted the technical services group of a commercial insurance company here to invest in a utility package.

The Pennsylvania Manufacturing Association Group (PMA), a commercial insurance company whose major product is workers' compensation, has grown in the past two years from a basic batch processing operation, running an IBM 370/148, to a complex shop with two 4341s, a large network of over 140 terminals and a distributed processing system of IBM 8100s in the field.

In addition to being one of the first companies to merge data and word processing on 8100s, the company also has pioneered the use of IBM's DL/1 data base management system, according to Bill Parton, assistant director of PMA's computer operations.

The next data bases to be developed were name, address and claims. "Once the claims data base was developed, it was actually the largest — in terms of quantity of records — on the data base in the country for a while," according to Mike Snee, assistant director of PMA's computer operations.

Understanding the size of the data base (2½ 3350s), IBM worked closely with PMA on its design-optimizing capacity, number of segments and performance.

Recently, PMA became a user of Compuware, Inc.'s DOS-DL/1 Abend-Aid package to handle DL/1 dumps. "A DL/1 dump is like almost any other dump; it has its standards. But every once in a while, it will throw you a curve, especially with its buffering. Sometimes it will stump a professional," Snee explained.

Along with the number of cancels incurred, PMA looked at the productivity of the programmer. "A programmer would sit down and spend anywhere from an hour to a day with a DL/1 dump. In this age of data processing, you want to help the programmer as much as possible because that's where your dollars are going," Snee said.

*(Continued on SR/4)*

## Inside

# Metrics: Tools to Aid Software Code Quality

By Jay Arthur
Special to CW‡

*Software metrics have been around for many years, yet most information systems departments have not invested in these quality analysis tools. In this article, Arthur declares that the time has come to mechanize much of what programmers and analysts do in code inspections to improve both the code and the quality of the programming staff.*

In the average company, systems maintenance and enhancement consumes 50% to 80% of the information systems department's budget. Why?

In most cases, the programs were poorly written to begin with. Next, they were enhanced in ways that caused them to decay, rather than improve. Finally, the programs became such a burden that management had to invest in rewriting them. Then the cycle repeated itself.

This recurring failure is caused by the lack of a means to examine the code and make qualitative judgments about its maintainability, flexibility, reliability and a host of other quality-related metrics.

Software metrics, based on a mechanized analysis of the system's code, provide a way to quantify these important quality characteristics before the program is even tested. Figure 1 shows the relative cost of fixing a defect at any point during the development process.

Structured design techniques have done much to improve the quality of system and program design. Most designs are not stored in the information systems computer, which makes it difficult to mechanize their analysis. Code inspections have yielded further quality improvements, but people are notoriously ineffective when it comes to inspecting code. Therefore, mechanized quality analysis of code seems the next logical topic to study.

Since code is the only readable product of the development process and coding consumes only 10% to 20% of the total development time, defects can be removed cost-effectively from the code once the metrics analyzers have detected a problem.

The software metrics analyzers examine the code, extracting counts of each of the language's reserved words, data names and literals. From these sums, the information systems numerologists can begin to identify correlations between the counts and the various quality metrics. Using this knowledge, programmers may first write a program, analyze it and then correct all known potential defects in the code.

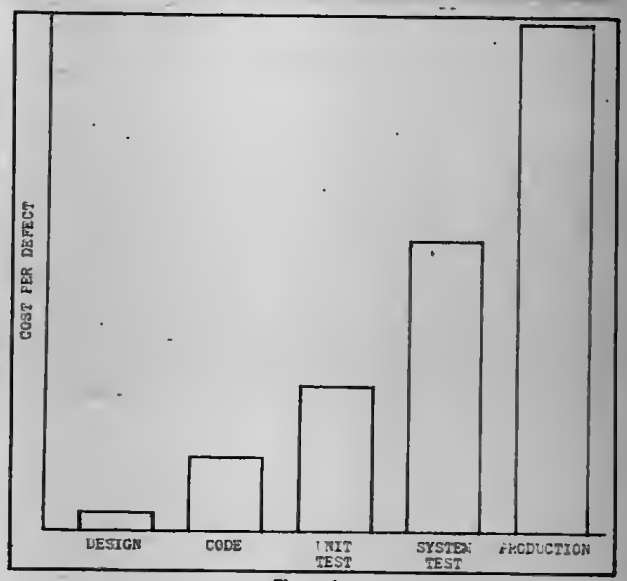



Figure 1

Manual design and code inspections have helped to improve quality and productivity, but they cannot be as exacting as a mechanized analyzer.

Code analyzers are impartial and give credit or criticism where it is due. They also can be run at any time so the programmer can find his mistakes and correct them without being embarrassed in front of his peers.

*Arthur works on productivity and quality analysis at Mountain Bell in Denver. He is the author of* Programmer Productivity, *a book recently published through John Wiley & Sons.*

# *Some Examples of Software Quality Metrics*

The most common quality metrics referenced in the literature are correctness, efficiency, flexibility, integrity, interoperability, maintainability, portability, reliability, reusability, testability and usability. Of these, the major metrics are flexibility, maintainability and reliability. Other metrics vary in importance according to the needs of the user.

Software quality analyzers can provide many of these metrics. Flexibility, maintainability and reliability are dependent on code complexity, which can be measured by executable lines of code, cyclomatic complexity or programming effort.

Executable lines of code is a count of all verbs used in the module or program. Edward Yourdon of the Yourdon Group suggests that this number should remain under 50 to maximize productivity, modularity and program structure. Other studies have shown that 100 executable lines of code may not be unreasonable.

In larger modules, complexity can be held to a minimum by restricting the number of decisions in the code. In 1976, Thomas McCabe proposed a measure of decision complexity known as cyclomatic complexity, which is essentially the sum of all decisions and comparisons in the program's logic.

McCabe found that modularity, and therefore flexibility, maintainability and reliability, were correlated with a cyclomatic complexity of less than 10.

Further research found that modules with a cyclomatic complexity of less than 10 contained no errors.

In 1977, Maurice Halstead published the findings from his study of software science in which he used the number of unique operators, unique operands, total operators and total operands to develop the first language-independent metric of complexity.

Figure 2 shows a comparison of the effort metrics for a Cobol and PL/I CASE statement. The PL/I SELECT statement is less complex than the equivalent Cobol IF-ELSE-IF statements. Note that the effort metric can compare two languages as well as two different but correct styles of coding.

```
COBOL CASE                                  PL/I CASE

IF A = B THEN                               SELECT(A);
                                              WHEN (B)
      (statements)                              DO;
                                                  (statements)
ELSE IF A = C THEN                              END;
                                            WHEN (C)
      (statements)                              DO;
                                                  (statements)
ELSE IF A = D THEN                              END;
                                            WHEN (D)
      (statements)                              DO;
                                                  (statements)
ELSE                                            END;
                                            OTHERWISE
      (statements).                             DO;
                                                  (statements)
                                                END;

Comparing the two:

Unique Operands      =  4.000000      Unique Operands      =  4.000000
Unique Operators     =  1.000000      Unique Operators     =  1.000000
Total Operands       =  6.000000      Total Operands       =  8.000000
Total Operators      =  3.000000      Total Operators      =  1.000000
Vocabulary           =  5.000000      Vocabulary           =  5.000000
Length               =  9.000000      Length               =  5.000000
Estimated Length     =  8.000000      Estimated Length     =  8.000000
Volume               = 20.397353      Volume               = 11.609540
Difficulty           =  0.750000      Difficulty           =  0.500000
Language Level       = 37.150850      Language Level       = 46.438562
Information Content  = 27.863137      Information Content  = 23.219231
E                    = 15.673015      E                    =  5.804820

CC                   =  4             CC                   =  4
```

Figure 2

These three metrics — executable lines of code, cyclomatic complexity and programming effort — have been widely studied and correlated with the productivity of both development and maintenance programming.

However, program structure and efficiency metrics are also available.

Program structure depends on each module containing a single entry and a single exit, which is comparatively easy to determine from the code. In Cobol, each paragraph should be single-entry and single-exit as well.

McCabe's paper on cyclomatic complexity identified the four possible ways to violate program structure: branch into or out of a decision or branch into or out of a loop. The GOTO, the operator which allows this crime, is easily counted with a software metrics analyzer.

Efficiency can also be determined from the code. First, the absence of GOTOs often implies good structure and therefore more efficient algorithms. Efficiency can also be determined from data types.

In Cobol, whenever numeric data is used, it should reside in the most efficient form — packed decimal or binary. Tables should use the INDEXED BY option for optimum efficiency. The binary SEARCH ALL verb is more efficient for large table searches than SEARCH, its sequential counterpart.

Once the code has been analyzed, the results should be placed in a data base for further analysis.

# Documentation Generator Frees Programmers

CHICAGO — How do you free your programmers to do the job they were hired for — programming — when you need to keep documentation current and relieble on hundreds of your own Cobol programs plus hundreds more that you are maintaining for client customers?

This question sent Management Data Communications Corp. (MDCC), e data processing center here, looking for help in producing the documentation required to provide a high level of accuracy in systems maintenance. Jim Gallichio, the firm's operations manager, explained that "We had the program maintenance well in hand, but we wanted to keep the documentation current, quickly and accurately, without tying up hundreds of programmer man-hours."

They found Sydoc, a structured documentation system from Syncsort, Inc. of Englewood Cliffs, N.J., which automatically produces comprehensive documentation of Cobol programs using only the source code. MDCC has been running Sydoc on its IBM 370/158 under the OS/VS1 operating system since last August.

Describing the results of the product, Gallichio said, "Sydoc probably saved us 500 man-hours the first time we used it. We had et least 350 program modules that had gone through numerous modifications. In some cases, only the source listings were current.

"With Sydoc, the job involved no programmer time at ell. We just processed the programs we needed through Sydoc and were able to print the complete documentation for those systems right from the output," he added.

Sydoc works by accepting the source code as input, analyzing it end producing e series of reports that reveal the program's structure, components and relationships. The reports include e hierarchy chart, a section process tsble, source listing cross-references and diagnostic end program statistics listings.

"We also gave the end users the documentation Sydoc produced, along with a few notes from the Sydoc manual explaining the verious charts. This often increased their understanding of the systems they used," Gallichio said.

MDCC was so impressed with the documentation system's performance that it decided to run all its Cobol programs through Sydoc, to make Sydoc available to its time-sharing users and to meke Sydoc-generated reports the standard for all its Cobol documentation.

Besides saving MDCC programmers the time it would take them to document current programs manually, the system also saves them 20% of the time they had previously spent on program maintenance and 15% of

(Continued on SR/6)

# Utility Improves Test Turnaround Time

(Continued from SR/2)

After the installation of Abend-Aid, the technical services group was surprised that not as many dumps were coming back to them. Aiso, there was better test turnaround. "If e programmer had e problem, he wouldn't see that test for e day. All of e sudden, the test was being turned eround in 15 minutes.

"Operations personnel noticed more testing taking plece as well as quicker turnaround. From thet point, the product practically sold itself," aecording to Snee.

Jim Weidman, group manager of systems support, discussed the use of Abend-Aid output. "Our people found it extremely easy to use," he said. "It gives the last instruction, next instruction end cuts down on time tremendously. The output is very straightforward."

Snee, who was the initial catalyst in evaluating Abend-Aid, pointed out that the whole company has benefited from this decision. "If we have e problem with a claims or checks epplication, the whole company suffers if it does not get out. In some cases, these problems even result in financial penalties from the state. With Abend-Aid, problems are turned around more quickly so eech job can be rescheduled for production," Snee said.

In the DP department, Abend-Aid helps the epplication programmer in both program maintenance end new system development. In maintenance, the programmer works on code he may not have seen before. In development, he has to combine his efforts with those of other programmers on the project.

In technical services, "We don't see abends anymore," Snee said. "We can use our time in ereas of new development," he continued. With problems being solved more rapidly, the needs of the users are better served, and, in turn, operations are more productive.

Parton pointed out that Abend-Aid also reduces frustration. "A programmer gets e dump, spends an hour fixing it and weits for the job to run egain only to get another dump. Much of this frustration is reduced with Abend-Aid. Better use is made of time, and systems get up faster," he explained.

"It makes not only the department, but each individual more productive, and that translates into money," Parton said.

Justification for the purchase of Abend-Aid was based, along with obvious gains in productivity, on results from the accounting analysis report provided as part of the free 30-day trial.

The analysis was run and presented to the director of data processing, F. Timmins Bretz, who has e programming background and understands the frustrations of storage dumps. The analysis indicated that 96% of the cancels are analyzed and suppressed by Abend-Aid, resulting in e projected yearly savings of more than $37,000.

Mike Snee, Bill Parton and Jim Weidman review the output of an Abend-Aid DL/1 dump.

# Improving Programmer Productivity

(Continued from SR/2)

er, close to 50% of the CPU cycles are used to manage multiple epplications at one time. In the case of the programmer, four tasks that might have taken one week each to complete now could tske two months to accomplish concurrently. The programmer is constantly busy, but the individual tasks ere getting done et a slower rate. Is this an increase in productivity?

Instead of giving the programmer something to do while waiting for batch processes to be completed, the software solution is to eliminate the batch processes. By utilizing an application development system that is completely on-line and interactive, there's no need to hurry up and wait. Programmers are both busy and productive.

Two recurring problems in data processing are related to the experience leveis of the staff members. "Averaging down" — the hiring of inexperienced people who actually lower the average skill and experience levels within the department — is the result of today's shortage of qualified DP professionals. This mixture of experience and inexperience leads to a second problem — the differences in the wey certain tasks will be accomplished.

The software solution to both situations is an epplication development system. It will eutomatically wash out the "experience gap" between old and new staffers, allowing the individuals and the department as a whole to become more productive.

All systems involve the collection, manipuletion and reporting of data. While the system must be looked on as one collective unit, the same tool is not alweys effective for each of the three components.

Every tool has e specific "threshold," and when the user exceeds the threshold, the tool becomes a hindrance rather than a help. Any software used beyond its threshold will cause decreases in productivity, not increases. And when individual products are put together piecemeal, the result is e system that has gone past its threshold — e counterproductive collection of misfit units that work against each other rather than with each other.

To solve this problem, the DP department must choose e system that is fully integrated, one whose components work well together. The system has to be adaptable to both simple and complex situations; toois that have low thresholds will not be adaptable, and problems are sure to follow. A system thet has components that do not work together in all situations will result in low levels of productivity.

Applications backlogs, personnel shortages and a lack of the right tools are frustrating situations, and some end users will try to solve these problems with alternatives such as minicomputers, microcomputers, time-sharing firms and so forth. These hardware answers might be effective for the short term, but they may not be a lasting solution.

When an individual department begins using e minicomputer, usually it will only need its own departmental data. As the epplications become more complex, DP must be called in to supply the corporate data. That defeats the purpose, because the minicomputer was installed to eliminate the dependency on the DP department.

Software, used properly on centralized hardware, can be a more effective tool than a collection of independent computers.

*Parks is Mentis product manager for Cincom Systems, Inc. in Cincinnati, Ohio.*

## *Saves Nightly Trips to Data Center*

# Documentation Aid Provides At-Home Listings

CANOGA PARK, Calif. — Programmers at an electronics and high-technology firm here are making fewer trips to their data center in the wee hours of the morning since the installation of an automated documentation system.

Mellonics Information Center, located here, is Litton Industries' western data center. It services the Litton Industries' divisions that are located in the western U.S. and offers commercial time-sharing services in California.

Being a large-scale center with multiple IBM 30 series and 4341 CPUs and a variety of software for both Litton and commercial customers, Mellonics faces large-scale problems. As is common in many large centers today, the programmer responsible for an application is not intimately familiar with it. This may be due to the age of the application, the infrequency of its use or the magnitude of the programs for which the programmer is responsible.

Before the acquisition of Docu/Text, an automated documentation system from Diversified Software Systems, Inc., programmers at Mellonics were on 24-hour call. If a programmer received a 2:13 a.m. telephone call concerning a problem, he would have to go immediately to the center, resolve the problem and have the job done on schedule.

Docu/Text, which provides automatic documentation for IBM OS(VS) systems, caught the attention of Sue Hattendorf, supervisor of commercial systems.

"One of the reports produced by Docu/Text is a structured JCL [job control language] listing. What made this valuable over other JCL lists was its readability and completeness of information," she explained. "The production JCL and expanded Procs [Procedures], along with symbolics, overrides and control cards are shown in the order they are executed. We thought if the programmers had this listing at home, most off-hour calls could be resolved by phone — and that is what happened," Hattendorf said.

Mellonics now provides its programmers with the Structured JCL lists of production systems it supports, resulting in a decrease of late-night visits by an estimated 80%. The complete set of Docu/Text remains at Mellonics.

Peter Loveless, senior data systems analyst, explained that "debugging by phone takes the edge off the night-time call. The JCL list is particularly useful for old and unknown programs. Usually the problem can be quickly corrected over the phone."

The firm also is taking advantage of other Docu/Text capabilities. Mellonics was recently handed a complex system of about 35 programs to install. The system was practically without documentation except for the user manual. Loveless was given the task of getting the system into production. "I estimated that it would take me six weeks to document manual-

*(Continued on SR/6)*

*'Programmers at Mellonics were on 24-hour call. If a programmer received a 2:13 a.m. telephone call concerning a problem, he would have to . . . resolve the problem.'*

# Documentation System Quiets Data Center

*(Continued from SR/5)*

ly," he said. "Fortunately, we had Docu/Text."

From the existing JCL, Docu/Text generated the JCL list and two additional reports: Data Set Cross-Reference and Condensed Job Listing. These reports told Loveless where each file was used and provided an edited list of each Job/Proc/Program/File in the system.

"A nice feature is its generated index; you can tie all the reports together so you know the relationships. Since Docu/Text uses existing JCL for input, with no changes, the desired documentation is almost instantaneous," Loveless said.

Another capability of Docu/Text is JCL syntax scanning and standards checking. It performs over 130 checks for such items as proper use of symbols, correct refer-backs and valid overrides.

This was a big help to Susie Iguchi, operations analyst. "I had a major JCL conversion to do and without Docu/Text, it would have taken at least twice as long. Its flowcharting, JCL listing and syntax checking were true time-savers," she said.

"All of our commercial and corporate systems are run through Docu/Text every two months, and listings are given to our programmers," Hattendorf explained.

"This has greatly reduced our manual documentation and saved a lot of time. We use it on a daily basis. Although I classify it as a support tool, it really is productivity software."

Because of its value as a programmer tool, Mellonics is considering making Docu/Text available to commercial customers, according to Matthew Stankey, marketing analyst.

"Mellonics is continually evaluating productivity software," Stankey said.



## System Frees Staff's Time At DP Center

*(Continued from SR/4)*

the time normally spent in problem resolution, Gallichio said.

"With Sydoc, the programmers get charts that tell them exactly what the program is doing, listings of any errors and a comprehensive listing of cross-references that shows them every line that a change will affect. They can use these listings to trace bugs, too," he said.

Another advantage, according to Gallichio, is the accuracy of the documentation Sydoc produces. "The documentation is as accurate as the program, not what the programmer thinks the program may be doing," he said.

This is especially important to MDCC because of its commitment to structured programming. "When they're halfway through developing a new program, the programmers run it through Sydoc to determine whether they are producing structured code. This knocks off a lot of time we'd have to spend to verify manually that our programmers are writing clear and concise structured code," he explained.

Managers at MDCC use Sydoc as a control tool to enforce structured programming, he said. They look at its Program Statistics Listing, which shows how effectively a program utilizes files, data and verbs.

"Sydoc has helped this shop enforce standards for systems documentation that previously were very costly because of the programmers' time that would have been involved. We're getting the structured documentation we want and leaving our programmers more time to do programming," he said.

*Major Project Called for New Method*

# Utility Firm Keeps Pace With Testing Facility

ITHACA, N.Y. — A materials management project, which doubled the number of programs and required 50% more application testing, prompted a utility company here to look for an on-line testing facility.

New York State Electric & Gas Corp. (Nyseg) serves 35% of the land aree in New York State. The utility company is staffed with 60 application programmer/analysts and programmers who are constantly developing and maintaining programs in order to facilitate the information processing needs of its many users.

To meet its data processing needs, Nyseg has two Amdehl Corp. 470/V6 Model II CPUs, each with 12M bytes of real memory, 64 Amdahl 6280 spindles and eight IBM 3380 spindles.

Up until e few months ago, Nyseg was satisfied with its epplication testing methods, which relied on a combination of batch terminal simulator and testing with en on-line IMS system.

"We had developed a schedule in our data center," said Ray Ingraham, data base end data communications supervisor, "that provided epproximately three to four hours of test time with an on-line test system. When the on-line test system was not on the air, we ran our [batch terminal simulator] jobs."

### Changing Picture

This picture soon changed when epproval was given for e major development project called materials management. Requiring the skills of 20 analysts and programmers, this project in effect doubled the amount of production programs and required 50% more application testing time.

It soon became evident that Nyseg's existing teleprocessing and batch testing methods were not able to keep up with the increased demands placed on them by this new project. "In order to allow the development to go forward," Ingraham explained, "we found that we had to sej urate our production test end development test activities. The two testing environments were operating in different modes. We had to protect the integrity of data bases for our maintenance testing and yet allow our development people to test their new programs thoroughly."

In separating these two test environments, Nyseg solved one problem but created another. "What happened," Ingraham continued, "was that we created a backlog of batch IMS application testing. Our first ettempt et a solution to this problem was to pursue the course of improving the turnaround of [batch terminal simulator] batch jobs. However, what we were really looking for was an on-line [batch terminal simulator] equivalent. That's when we found Test/IMS."

Test/IMS, which is marketed by Consumer Systems, Inc. in Downers Grove, Ill., is e testing tool that provides diagnostic information while testing on-line or batch IMS programs. "If you can comprehend what e compiler and linkage editor do for you, you can use Test/IMS. It's just another link edit step in your JCL."

He went on to explain Nyseg's use of Test/IMS. "Productivity has definitely increased. Previously, we might have spent two or three test runs checking a program. Those three runs could take the better part of e day. But now with Test/IMS, the same test runs can be made during one two-hour test session with the on-line system. We can have a programmer testing a program at a terminal and in e matter of minutes, be looking et printed output that shows the data base call that the program made.

"In the IMS environment, you may have a programmer who spends an hour putting together one test end then he is looking et another hour to get some results. Using Test/IMS, the programmer just goes to an on-line test terminal, calls up his format, enters the data and runs the transaction.

"We're looking at e considerable difference in time. During a typical teleprocessing session, we're still able to test a program by using Test/IMS, whereas previously, we had to weit for the teleprocessing session to end before we could run e test session."

Nyseg said that Test/IMS has cut down on both the turnaround time for programmers trying to test their programs and the labor-intensive set-up time for a test session. Test/IMS has increased programmer and analyst productivity at Nyseg. "In the same given amount of time, we can accomplish much more using Test/IMS," he added.

# Application System Helps Bank Stay Ahead

NEW YORK — Volatile activity in the financial marketplace has not changed the position of Morgan Stanley & Co., Inc. as America's leading investment bank. Morgan Stanley has not only maintained its strength throughout the last decade, but it has grown substantially while more than doubling its revenue per employee.

One key to this growth has been the firm's use of advanced application development systems. Morgan Stanley has relied extensively on two products from Software AG of North America, Inc.: Natural, an on-line application development system, and Adabas, a relational data base management system.

Morgan Stanley recently released a study of the resulting impact on systems development productivity. The study concluded that using Natural instead of Cobol has improved productivity by a factor ranging from a minimum of three to a maximum of 20.

According to Scott G. Abbey, director of data administration, the use of Natural began on a trial basis in 1980, two years after the installation of Adabas to support the firm's first on-line applications. Natural is now Morgan Stanley's standard for all application development of data base and transaction processing systems, both on-line and batch.

When installing Natural, Morgan Stanley took steps to minimize programmer resistance to the new technology, including a highly visible pilot program, high-level management support and encouragement and staff education.

In addition, the company established a management training program specifically for management information systems (MIS) personnel, with trainees selected directly out of liberal arts colleges.

"The people we hire typically have absolutely no computer training or experience," Abbey said, "and therefore no preconceived notions of how systems should be implemented or which languages should be used. The training they receive teaches them Natural and exposes them to the development techniques we have evolved at Morgan Stanley. They don't know any other way to develop systems and are frankly amazed at the speed at which they begin to develop applications using Natural."

Not only has there been no resistance at all from this group, but "We've found that these people often tend to write better programs sooner than more experienced personnel who often begin by trying to write Cobol programs using Natural, which doesn't really work," Abbey said.

Morgan Stanley trainees with one to three years' experience now produce approximately 1,250 raw lines of Natural code per month, equivalent to at least 2,500 lines of Cobol, Abbey said. By contrast, IBM's own estimate of senior programmer productivity using Cobol is 600 to 800 lines per month — less than one-third that of the Natural trainees.

### Additional Benefit

The success of the management training program has helped Morgan Stanley's conversion to Natural. In another way, Abbey said. Programmers hired before the training program began now find themselves competing against former trainees for senior positions. In order to compete successfully, they use Natural.

"It's hard to stand up and tell somebody who's been writing Cobol programs for years, 'You don't have to do all that stuff. You can do it this way and it works,'" he said. "They don't believe it — it sounds too good. Only now they do believe it."

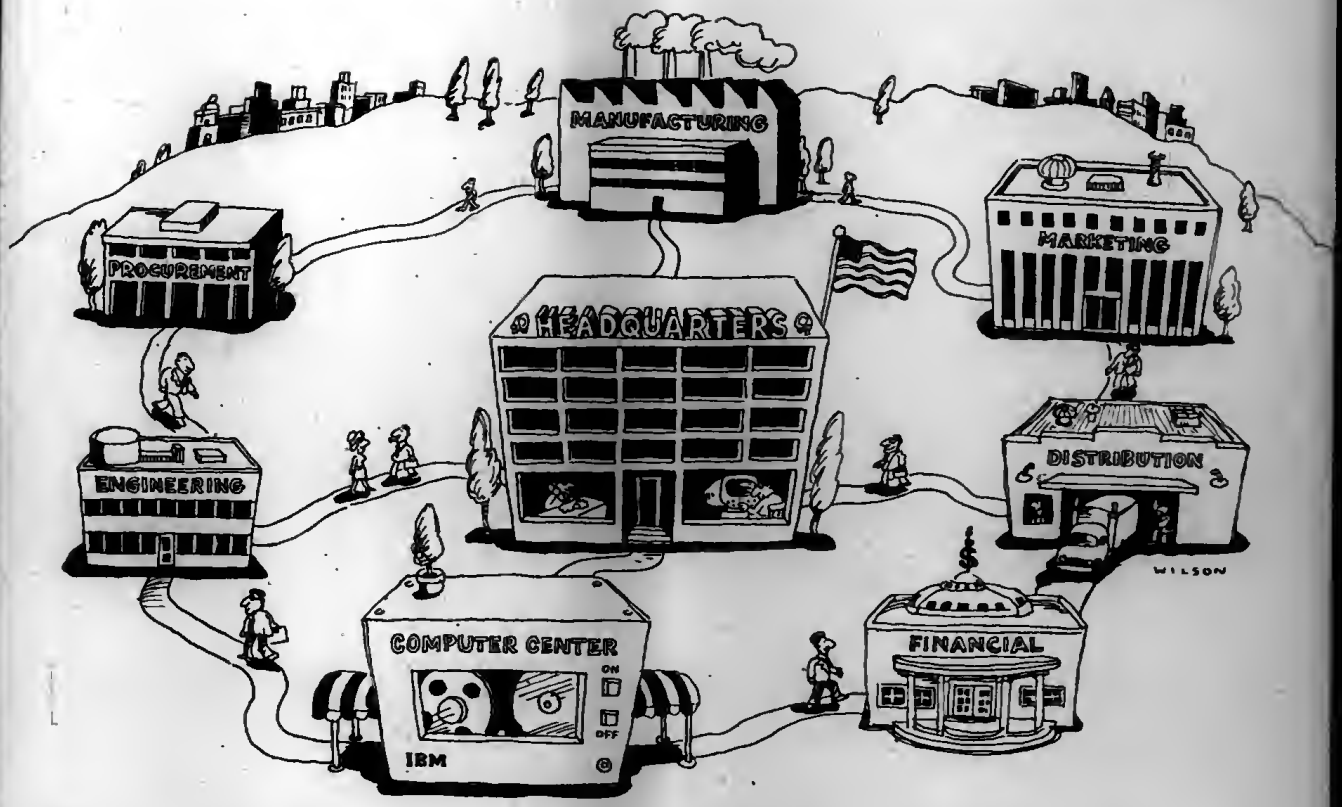
Abbey suggested that setting a norm rather than allowing staff to make their own language decisions pays off quickly through improved programmer output.

Natural has enabled Morgan Stanley to bypass traditional approaches to systems development in favor of a less structured, freer approach in which end users are involved from start to finish, Abbey said. "We do not do detailed specification documents for application systems. We have found these to be costly to produce and only marginally useful in the actual development of the system," he commented.

"Instead, we foster a close relationship between our systems development staff and the people in the firm's business units. We'll have someone sit down with an end user to determine what's needed, then go right ahead and develop the code, demonstrate it and, if necessary, modify it — all right there at the terminal."

"The information center is not merely a concept to us or a small component of MIS, but rather the essence of what MIS should become. And because of Natural, we are already partway there," he concluded.

XEROX

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# Fuel Firm Tracks Inventory With High-Level Language

OMAHA, Neb. — Liquid fuels like ethane, propane, butane and natural gas present unusual management problems. Not only do they demand unconventional means of storage to retain their liquid state, but that storage, at least for Northern Liquid Fuels Co. here, encompasses tanks and underground caverns at over 150 sites. Northern Liquid Fuels is an operating unit of Internorth, Inc., a $4.2 billion energy company.

The DP department at Northern Liquid Fuels was charged with developing a management and accounting application that would service approximately 50 marketing, accounting and management personnel for UPG, Inc., one of the five companies that make up Northern Liquid Fuels. The information would then be accessed through 20 IBM terminals, including three at remote sites.

UPG, which buys, sells and exchanges natural gas liquids at the wholesale level, requested an application that would give it access to and the ability to retrieve data to answer three essential questions about its inventory: what it has, where it has it and how much is invested in it.

Northern Liquid Fuels answered with an application composed of 18 interrelated files, 40,000 blocks within the data base and 430 program modules that result in between 60 and 70 standard reports. The project was accomplished in 2½ years with 15,200 analyst hours and the aid of Mathematica Products Group, Inc.'s Ramis II fourth-generation language and data base management system (DBMS). Reports are produced by non-data-processing personnel in one to two hours, a spokesman said.

The use of Ramis has had a significant impact on the information collected at Northern Liquid Fuels and how it is viewed, commented Bob LaSure, director of applications development for the company. "It has accelerated the rate at which we do things. We now think in terms of hours or days instead of weeks with conventional applications."

According to LaSure, an average of 190 lines of code were developed daily by a project team of three programmer/analysts and, at the height of the development, an additional four programmers. The development time included a user requirements study, design and implementation of the application and a seven-month systems test and parallel. LaSure estimated that the entire project would have required at least twice the resources if conventional programming tools were used.

Prior to development of this application, Ramis II was used primarily on a limited scale for financial applications. "Our productivity increased proportionately with our Ramis II learning curve," added Harry Wood-

*(Continued on SR/12)*

Team leader Harry Woodstrom and systems analysts Jacki Van Driel and Maria Wray

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# Statistical Package Pays Off for E.I. Du Pont

WILMINGTON, Del. — E.I. Du Pont De Nemours & Co., Inc. played the odds when it bought statistical software from SAS Institute, Inc. The payoff has been in the form of more informed business decisions made by executives using computer simulations and other programs.

At Du Pont, the information systems department's business consulting group offers assistance in operations research, quantitative problem solving and small systems development to all departments within the company, according to Debra Milstein, business consulting analyst.

The group develops analytical models and computer programs to facilitate decision making.

Of particular note are three projects designed to help management estimate future business trends, determine profitable production strategies and evaluate rail car fleet management, Milstein said. Responsibility for operation of all three systems was assumed by each user department shortly after they were developed using SAS products.

### Simulation Project

A sales and earnings simulation project was developed for one large operating department to assist management with capacity and facilities planning as well as marketing and investment strategies.

The department required a model that could predict future sales and earnings based on future events. These events had some un-

*(Continued on SR/16)*

## Tool Helps Fuel Firm Move Ahead

*(Continued from SR/10)*

strom, manager of the project team.

All of the staff programmer/analysts received one week of formal class instruction in the use of Ramis II's nonprocedural, English-like language prior to developing the application.

The new fuels management application runs on an IBM 4331 under DOS/VSE in the batch arena at Northern Liquid Fuels.

The system includes 92 Ramis II programs, referred to as requests, averaging 150 statements per request.

Also included in the application are 38 Cobol programs consisting of 87,000 lines of originally developed code plus 35,000 lines of copy-book code that accesses files through RPI, the Ramis II procedural language interface component.

Ramis II is used for reporting and nominal file maintenance, while its RPI component is used to update fields from Cobol programs.

In addition, 140 screens were developed to permit on-line data entry by system users.

### First Solo Run

The new application took its first solo run in April 1983 after running in parallel for three months.

According to LaSure, Northern Liquid Fuels decided to use Ramis II for testing and paralleling because the Ramis II records management capabilities allow in one hour what an entire Cobol program takes days to develop.

"Now, we spend miniutes retrieving information with Ramis II instead of hours or days programming in Cobol," he said.

Instead of converting old Cobol programs, a master file produced by Cobol is loaded into a Ramis II data base. Quick ad hoc reporting from this data is then possible with user-friendly ease, explained LaSure.

# 'Garbl': The Ultimate Language For Programmers Gets a Manual

By Donald B. Wentz
Special to CW‡

*In his never-ending search for the ultimate programming language, Wentz said he came across a manual for a language that should be considered for that honor. "Unfortunately, I was able to secure only the first chapter, the rest of the manual apparently having been used in the executive washroom," he reported.*

This manual is intended to be an instructional text to familiarize the reader with the destruction set of the Generally Atrocious and Readily Botchable Language (Garbl).

Garbl was designed for three major reasons:

1. To significantly reduce the time required to code application programs.

2. To minimize debugging time through use of high-level instructions and a structured approach.

3. To afford a reasonable level of efficiency by allowing the interjection of assembler language code where desired.

Unfortunately, these three major design goals have been laid aside in favor of:

1. Significantly reduced understandability.

2. Minimized debugging capabilities through use of high-level complexity and a constricted approach.

3. The inefficiency of allowing the interjection of sometimes correct assembler code whenever Garbl desires.

Garbl is not a compiler; it is a pseudolanguage in disguise. The high-level instructions are actually middle-level macros that generate varying low-level assembler language statements. It is this aspect that enables the program to insert assembler code at any point in a Garbl program, thus distinguishing Garbl from other working high-level languages.

Garbl was originally designed to alleviate some of the tedious, time-consuming problems for assembler language application programmers, such as data conversions and complex conditional coding. It has, however, replaced these tedious, time-consuming problems with tedious, time-consuming debugging for assembler language application programmers.

It has grown to the extent that almost any program could be written entirely in the high-level instruction set of Garbl (or Egyptian hieroglyphics — not an unreasonable analogy), and the programmer should not know assembler language to use it to avoid confusion.

The following fundamentals are essential in using Garbl correctly:

1. Every Garbl program is divided into three sections — program section, data section and bug section.

a) The program section contains all the executable, nonexecutable and partially executable instructions.

b) The data sections contain all work fields, plowed

*(Continued on SR/16)*

*Working Through Development Stages*

# Making the Most of Software Productivity Tools

By Howard A. Rubin
Special to CW‡

In general, the essential ingredients for increasing the productivity of software development and maintenance are proper management, a skilled work force and the right tools.

Unfortunately, most organizations seem to leave out the first two ingredients in favor of concentrating on the tools and the measurement of their impact.

Perhaps the reason for this lies in the promise of short-term gain leading to the mythical quick fix. At this point, it is not worthwhile to dwell on the inadequacies of this approach, but rather to focus on its actual potential for improving productivity.

In this context, a number of steps can be taken to assess the productivity-increasing potential of tools alone.

A software productivity tool is a mechanism by which one hopes to decrease the total effort expected to develop and maintain a software system. Because the decrease can only be computed if one has a base from which to compute, one must be able to answer what the effort would be if the tool was not used.

It is important to realize that tools do not change the size of the software development effort; they act only to reduce the amount of effort required.

There are two major components that affect the amount of effort involved in a project. The first is its hypothetical size, which is bound to set off gross business characteristics of the system in a world of normalized techniques. Even without the application of tools, this effort can be reduced by changes in those factors influencing gross effort.

The second component is the actual work effort influenced by the tools used in implementation and maintenance. It is effort reduction at this stage for which the productivity tools are meant.

Most software products pass through the following stages in one way or another: development, requirements definition, external design, internal design, programming, system test/installation, maintenance, repair, adaptation, enhancement, redocumentation, optimization and obsolescence.

### Hypothetical Case

Imagine a system that takes about 1,000 hours to develop in the hypothetical world of normalized techniques. Simple development/maintenance modeling predicts roughly a 1,500-hour maintenance effort for this system.

If this information is coupled with vendor/opinion leader claims for potential gains of each phase, the bottom line is that the development effort has been reduced from 1,000 to 460 hours, a 54% decrease. Maintenance has dropped from 1,500 to 503 hours, a 67% decrease.

Overall, the life-cycle effort has dropped by 62%. In short, this means that by using productivity tools, as many as 2.6 systems can be produced for each one produced today.

The decrease in the coding phase is attributable to the use of application generators. Testing is reduced by the claims of those marketing test data generators, which also influence the fixed phases. Redocumentation is not necessary because the systems are optimally self-documenting. Code optimization is not possible because reachable code does not exist.

Adaptation and enhancement are really very similar to new development and will reap the same relative gains because the same tools can be applied to them. Advanced tools like design workbenches and prototyping workbenches not only meet requirements, but shorten the design process and increase its accuracy.

Should developers call up their customers and announce the end of the backlog because tools are on the way? Not yet. Although tools have a high potential, the management and

*(Continued on SR/15)*

# A Balanced Approach to Life-Cycle Methodologies

A life-cycle methodology is used as a tool both to gain control over all the phases and to optimize the whole process.

In this sense, life-cycle methodologies ere overambitious — they cannot do both in all cases. It is in the balanced epproach to reeping the maximum potential for productivity that gains can be realized.

The most common cause of the failure of a methodology in an organization is resistance. Resistance is just a symptom of the basic disease of most methodologies — overkill. Even those methodologies that promise alternetive scenerios dependent on project size suffer from this. They lack e technique to size the project that allows the proper match between project and scenario.

In addition, none gives adequate recognition to the fact that the project size is really bound before the project starts and thet it can be influenced prior to epplication of the life cycle.

From the developer's viewpoint, the value of the life cycle is low for small projects while its overhead is high. At the other end, for large projects its value may be high, while its relative overhead is low.

The key question is: "What is the crossover point?" Answering this will yield some insight into the epplication of methodologies.

Communication complexity within a project greatly influences the size of the effort. The basic implication is to minimize team size and personal interfaces.

To understand what this means in operational terms, suppose for e moment that there is a team size that can be supported effectively by a single manager. There is a size below this such that a single manager can handle multiple teams, and a size ebove it thet requires multiple managers.

We will call the single team/single manager "ML1." The one-manager-too-many team will be called "ML2" and the last category will be called "ML3."

At ML2, individual project size is the smallest. At this level, the team carries out all development functions from definition through installation. Although all phases of the life cycle are passed through, the least formal procedures are needed — milestone reporting, customer documentation and information necessary to support maintenance. This is in fact a small projects group.

At ML1, projects are obviously lerger. The manager directly assists in carrying the project from the beginning to the development end. Beceuse of the level of interaction and team continuance, tools such as evolutionary prototyping become vieble. Methodology procedures ere again informal, with the same primary focus as ML2.

At ML3, traditional project management techniques break down. Team size could get extremely large, and tool interference may become active.

To cope with this situation, the development process must be broken down into an assembly line with "phase specielists" operating in their appropriate areas of expertise.

Management control of the project is exhibited primarily at the phase level. A single project expeditor is used to oversee progress between phases and act as the primary managerial interface with the customer community.

The life-cycle methodology is extremely important and rigorous for this class of projects, but in a new context. The methodology provides for interphase communication in the same way check sheets do on a traditional assembly line.

Only necessary information, in a standard, clear formet, is passed to the next station. By managing et this level, communication complexity is brought to more manageable levels. This acts externally to decrease overall project size.

Staff deployment across the three categories and within the assembly line can be modeled and implemented based on a given organization's work load. As more robots become available, the nature of the assembly line may change, but not its overall conceptual structure.

More importantly, we have developed e new view of life-cycle methodologies. They are primarily vehicles of communication and milestone reminders. They should not specify design techniques or control techniques.

## Steps to Assess Tools' Potential

*(Continued from SR/14)*

staff capability issues are far from being addressed. These are, in fact, the enabling ingredients thet will activate the potential of the tools.

The use of the tools themselves must be carefully managed and integrated or tool interference — e performance degradation influence — will result.

A tool is a local optimization technique that is epplied to shorten the effort needed to complete a life-cycle phase or set of phases.

*Rubin is an instructor at Hunter College in New York.*

# A Manual for Effective Use of 'Garbl' Language

*(Continued from SR/13)*

fields, constants, tables, chairs, minds and other elements that may be changing during program execution.

*c)* The bug section is scattered throughout the program to enhance the challenge of locating the various bits and pieces.

2. Variable names and statement labels.

*a)* They may be no more than eight characters long (sometimes seven; that's part of being variable).

*b)* They may be decomposed of any combination of alphanumeric characters, as well as #, @, $ and Hamlet.

*c)* The first character must be A—Z, #, @ or $.

*d)* All other special characters are invalid in various names and statement labels.

*e)* Statement labels must always begin in Column 1 of the card.

*f)* Statement labels must always carry the Surgeon General's warning about being hazardous to one's health.

Examples:

A. LABEL1 valid

B. 1LABEL invalid (begins with nonalpha character).

C. @1#$# valid (but must carry an 'R' rating).

D. RUBELLA invalid (fever too high — weak).

E. LABEL1973 invalid (bad year).

F. Invalid (no label).

G. LAB23E5 valid.

3. Comment Cards

*a)* All comment cards must have an asterisk in Column 1.

*b)* Any characters, including blanks and special effects, are valid as part of the comment.

*c)* Comment statements must lie between Columns 2 and 71 of the card, impulsively. Garbl statements may lie at any time.

Examples:

```
* THIS IS AN ORDINARY COMMENT STATEMENT.
* THIS IS A %#$@¢#*#$ COMMENT STATEMENT!
```

*Wentz is e programmer/enalyst with the Montgomery County Intermediate Unit's Special Educetion Center in Norristown, Pe.*



# Firm Plays Odds And Wins Big

*(Continued from SR/12)*

certainty associated with them, Milstein said.

The model would simulate the occurrence of these events based on the probability assigned to them. Additional requirements included an easily accessible data file that would store all of the events for a simulation run, both graphics and tabular output, documentation code and detailed user documentation.

Developed in less than two months, the system was coded using SAS data steps and procedures. Milstein attributed the fast turnaround to the high-level procedures for generating random numbers and plotting graphs in SAS.

In addition, Du Pont reported over $50,000 in savings by developing the project in-house rather than through a consulting firm, Milstein said.

Another large unit of the company needed to assess which products would be most profitable to produce in light of limited machine capacity, Milstein noted. The Product Profitability System was completed in four months, consisting of eight programs that rank products in different categories including plant, business unit, market and sales class.

The eight programs reside on IBM's TSO and can be submitted through batch processing on an IBM 3270 terminal.

The SAS programs compute a profitability index based on several variables including raw material and direct labor costs, freight, duty and selling price, Milstein said. The system can also be used with SAS/Graph to produce color graphs of the data.

In a third study, a Data Preparation System was developed to complement an already existing rail car fleet simulation model. The model was designed to help improve distribution strategies for Du Pont products, according to Milstein. However, original data preparation procedures for the model proved to be time-consuming and too complex for wide use.

SAS was selected to develop this system because of its data extraction and manipulation capabilities, Milstein said.

The system shortened the data preparation process from three weeks to one day, Milstein said. The system cost under $20,000 in manhours and computer costs and has proven to be inexpensive to operate. Preparing the data for one single-base case simulation run cost approximately $20, she said.

# Ada 'Package' Good Bet For Enhancing Productivity

By Michael R. Gardner
Special to CW‡

The U.S. Department of Defense, which sponsored the development of Ada, will require its use in certain contracts and internal projects. But eventually, many nondefense organizations will realize that there are other good reasons to use Ada.

One such reason is that Ada has many features that enhance software productivity. This is especially so for large-scale software systems involving at least several thousand lines of code and several programmers. These same features also facilitate the use of software components written by another organization and obtained off the shelf.

The most relevant productivity enhancing feature of Ada is the Ada "package." A package contains a set of declarations and subprograms designed to solve a group of related problems. (In this article, "package" is always used in this Ada-specific sense.) A given package could be used by several programs, each of which needs to solve some of the problems the package addresses. The problems might be sufficiently general so that one package could be used in a number of different projects, or the problems might be specific to one particular project.

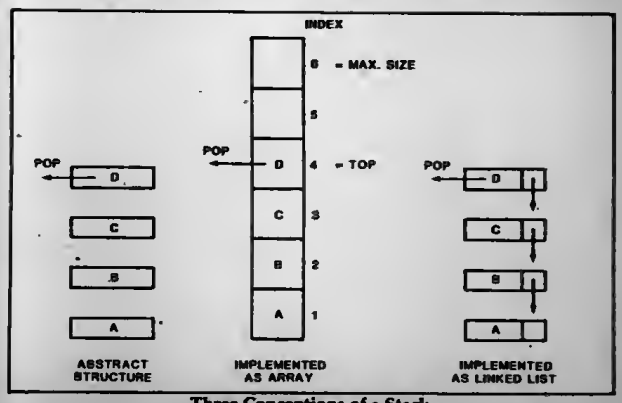
An example of an Ada package is a facility intended to enable a programmer to control a terminal without being concerned about its particular control codes for activating such features as cursor positioning, display modes and protected fields. The programmer calls certain subprograms and since their names and effects are the same for all terminal types, software that uses this type of package fits any CRT.

The facility to establish libraries of separately compilable subprograms has been available for some time, with older languages such as Fortran and PL/1.

The novel contribution of the Ada package concept to software design is not this, but the way in which the software engineering principles of abstraction and information hiding are built into the language.

Abstraction is the separation of the purposes served by a program unit from the details of their implementation. At the highest level of ab-

(Continued on SR/18)




Three Conceptions of a Stack

# Turn to Yesterday's Cobol to Up Productivity

By Jerry Sitner
Special to CW‡

Week after week, the industry's leading journals are overflowing with outrage at the magnitude of corporate productivity problems — problems that can frequently be traced to highly inefficient maintenance of computer programs.

The data processing maintenance cost crisis is just beginning to be publicly acknowledged, but ita origins go back over 20 years. With corporate America more dependent than ever on data processing today and maintenance costs continuing to increase exponentially evety year, this "recently discovered" crisis threatens to bring corporations large and small to their knees sooner than even many professionals suspect.

The time to act is now. Why should it take weeks or months to modify a computer system?

None of the commonly accepted cost reduction methods are valid. Current methods of documentation won't help. Current coding methodology doesn't help. And reducing the size of program modules is practically worthless.

The solution I would like to propose may come as a surprise. All it requires is a simple reorientation of

*(Continued on SR/20)*

# Ada 'Package' Can Aid Software Design

*(Continued from SR/17)*

straction, stacks are simply objects to which certain operations (CREATE, PUSH, POP and IS EMPTY) are defined as satisfying certain axioms.

To provide such objects and operations might be the purpose of a given program unit.

At a lower level of abstraction, the unit might implement a stack as a linked list or as an array (see diagram on SR/17). The coding of PUSH and POP would vary according to the implementation chosen.

Abstraction reduces the amount of complexity and detail to cope with while working on a given problem.

In addition to this, it makes it possible to change the way a given capability has been implemented without affecting the code that uses the capability.

### Large-Scale Projects

Abstraction is especially important in a large-scale project or one using preexisting software componenta. In either situation, it is helpful for one programmer to be able to use the work of another without understanding all its details. In the stack example, one should not have to think about links or array indexes when using PUSH or POP; nor should one's use of these operations depend upon their implementation.

The notion of abstraction is realized in Ada by means of the distinction between a package's specification part and ita body. The specification part of a package contains the declarations and subprograms accessible by code outside the package. It is independent of the package body because the user of the package can save time and mental energy by ignoring the body.

Also, if a change is made to the package body but not to the specification part, the programs using the package can use the new package object code without themselves being revised or even recompiled. This means one programmer can enhance the speed or accuracy of his implementation of a process described in the specification part without affecting either the source code or the object code of his co-workers who use the package.

In general, information hiding means making certain information inaccessible to some program units by virtue of a language's rules of scope. Often, it is desirable to enforce abstraction via information hiding. This renders inaccessible at higher leveis of abstraction the implementation details located at lower levels.

Ada packages provide two main ways of achieving this. One is that the user of a package cannot access those constanta or variables or call those subprograms that do not appear in the specification part.

The second mechanism for enforcing abstraction by information hlding is the Ada facility for private and limited private types. If a type declared in a package specification part is defined as private, a user of the package cannot make direct use of the object structure of those types.

*Gardner is a senior applications programmer with Intellimac, Inc., a Rockville, Md., firm that has been writing commercial software in Ada since October 1981.*

*Look for Efficiency, Vendor Support*

# Be Selective in Choosing Productivity Tools

By Michael D. Gabriel
Special to CW‡

Among the features to consider when choosing a productivity package are ease of use, efficiency, vendor support and capability.

If the package being evaluated interfaces with the end user, it must have a clear and understandable interface or command structure. Because users tend to be critical of computers, productivity tools must be user-friendly. When users make mistakes, the package should inform them as to the nature of the error and allow them to try again.

Quick response time also is important. If things appear to be moving easily and quickly, then the user feels more comfortable.

For the programmer, the package needs to be well-documented and easy to understand. Ambiguity will only cause frustration. The features of the package need to be easily understood and easily implemented. The programmer needs to be able to do as little as possible to make the tool work.

Efficiency can be broken into ease-of-use efficiency and runtime efficiency. Ease-of-use efficiency relates to the use of the programmer's time in implementing a package. The programmer cannot afford to spend time to make the tool work. The language and/or commands of the tool must be clear and concise. The less the programmer has to instruct the tool, the more efficient the tool is for him.

Runtime efficiency deals with the amount of CPU resources the productivity aid requires. Some tools will draw heavily upon CPU resources. If the tools are not designed properly, they will become a burden to the system, which, in an interactive environment, would be very detrimental.

The more a tool works with the computer, the more efficient it will be. For example, if a tool is written in the same language as the computer's operating system, it will work with the computer rather than against it. This is because the likeness of languages will enhance each other.

Vendor support is also an important consideration. This means that the vendor will assist a shop if problems or questions arise, and the vendor will take an active role to ensure the continued development and maintenance of its package. If a vendor does not offer support, it makes one wonder how good the package really is. This support usually does not come free. Each vendor has his own terms.

*'Productivity has become to DP what team spirit has long been to sports — something everybody wants, but nobody knows how to measure.'*

The choice of a productivity package depends on its ability to meet needs. Before the search for a tool begins, it must first be decided what the criteria for selection will be. Whatever is decided, the selection should not be made based on sales pressure or the need to buy something. Instead, there should be a thorough analysis of the various package capabilities to help ensure satisfaction down the road.

Productivity primarily has been measured by lines of code. But with

*(Continued on SR/22)*

# Yesterday's Cobol Can Solve Productivity Woes

*(Continued from SR/18)*

management and programmers.

Back in 1959, a distinguished group of users, academics end computer company representatives met to create a computer language that would be compatible with all computer hardware.

We can all be grateful that they decided to formulate a new language that "could be used by novice programmers and read by management," and that those ends "would be achieved because of the intended use of English . . . making it 'easier to read.'"

Surely these great minds must have been tempted to give in to the "memory" limitations of the hardware back then, which were much more severe than today. They could easily have been swayed to create a language that was more efficient to write, that used more "computerese" and less English.

But they didn't. In their infinite wisdom, they sensed that readability and understandability of source coding would be the basis of productivity for Cobol. And even then, they knew that the extra time spent in coding would be more than made up for by the time and money saved when the program had to be tested, "debugged" or modified.

Cobol's creators fully intended that their new language would help keep data processing maintenance costs to a minimum. So how do we explain that Cobol installations all over the country are having devastating effects on corporate and government bottom lines?

### 'Broken Cobol'

It is because today's Cobol no longer looks or acts like the Cobol designed in 1959. Today's Cobol isn't written in clear English. Instead, it's being written in "speed writing," which produces "broken Cobol" thet is full of abbreviations and shortcuts that no programmer should be expected to understand.

This strange "broken Cobol" even makes it difficult — and time consuming — for a programmer to modify his own program. This problem intensifies if e programmer is asked to modify someone else's coding.

Management encouraged it. Under the pressures of a "get-it-done-yesterday" corporate America, the readable, understandable Cobol literally fell to pieces. Management knew that clear source coding, "clarity coding," took e little longer to produce — so it was sacrificed.

The immediate need for specification-correct programs was thought of as being met. In reality, even this was a misconception. But somehow no one foresaw the cataclysmal effects that "broken Cobol" would have on corporate productivity.

The only valid wey to keep data processing costs from accelerating — and corporate productivity. from plummeting — is to go back to using Cobol as it was originally conceived.

It is en idea so simple and so conservative end so inexpensive — no wonder you've never heerd it from people hawking costly cure-all softwere.

The best part ebout the Cobol clarify concept is the way it keeps everyone happy: management, programmers and especially users.

Management gets increased productivity, e dramatic decrease in program maintenance costs as new "clarity-coded" programs are gradually phased in to replace costly "broken Cobol" programs and the increased job security that comes from e high productivity-to-budget ratio.

The efficiency of all corporate departments that depend on data processing will be enhanced because all DP systems will have longer life cycles. There will also be decreased turnover of valuable DP personnel who were either fired or resigned because of the frustrations associated with the maintenance of unclear source coding "broken Cobol."

The programmer gets easily maintainable programs because they are more likely to be specification-correct, end most modifications will be to enhance rather than to correct problems. Programmers will be encouraged to be creative because e truly innovetive Cobol program that can be understood and eppreciated will be the model for programming excellence. The programs produced will heve readable, useful comments thet reduce the need for "desk-checking."

In the past, comments have been used incorrectly to restate program functions rather than to explain the methodology being used to implement the function. As e result, there will be e boost in morale and pride for programmers.

The user will benefit because his modification requests will be fulfilled much more quickly, and new programs will get into production sooner.

*Sitner is president of Sitnerology Co. in New York.*

*Cuts Program Test Time by 50%*

# Oil Firm Does Well With Cobol Tool

BARTLESVILLE, Okla. — Testing time for Cobol applications has been reduced by 50% and production abends have been decreased since a petroleum company here installed a productivity package.

Phillips Petroleum Co. employs over 200 programmers to staff the information center at its corporate headquarters located here. The information center develops and maintains commercial and technical data processing applications and maintains the network base for the company's facilities worldwide.

Gary Blancett, Phillips' manager of support systems and controls, explained that the testing phase of programming was targeted as a prime area for potential productivity improvements.

"We were facing a major challenge," Blancett said. "In addition to our increasing requirements, we were in the process of converting our programming methodology approach to the use of structured design and subroutines.

"We needed to find a faster way to make program changes and decrease the number of abends occurring in production programs." After investigating the debugging and testing aids available, Phillips installed Xpediter, an interactive productivity tool for Cobol programmers developed by Application Development Systems, Inc. of San Jose, Calif.

"Xpediter was the only tool on the market that met all of our needs," Blancett said. "On the paper evaluation, its interactive abilities alone showed dramatic potential for time savings," Blancett added.

Once installed, Xpediter was made available across the shop. Bob Wesneski, the IBM MVS enhancement developer who aided in the programming methodology conversion, explained, "When we began to ask people to code subroutines instead of the old spaghetti-type programs, there was some resistance. Previously, in order to test out a subroutine, you had to build scaffolding around it consisting of driver and stub programs. This is basically throwaway code and a wasted effort," he said.

"With Xpediter, a few commands simulate the roles of both the calling module and the nonexistent lower level modules, thus eliminating the need to generate throwaway code. As a result, testing became faster and easier, and programmers became more receptive to the concept of coding subroutines," Wesneski said.

Now, two years later, Xpediter is used to test nearly all new subroutines — taking less than half the time it took before.

Xpediter is also used in program maintenance to support the huge programs that remain unstructured. Kathy Roddy, a programmer analyst, maintained two such programs in one of the systems she oversees.

*(Continued on SR/22)*

MVS enhancement developer Bob Wesneski helps programmer/analyst Kathy Roddy with Xpediter.

# Oil Firm DPers Save Energy With Cobol Tool

(Continued from SR/21)

"I have two programs that were written 13 years ago that have 9,000 and 7,500 lines of code. With all the altered GO TOs and the GO TOs out of performed paragraphs, working with these programs was a real challenge," she said.

"The only feasible way I found to follow the paths of the programs and then to understand what was going on was through Xpediter. By logically stepping through the program, I can usually spot the bugs pretty quickly and then fix them by assigning different values to variables while under the test mode.

"With normal turnaround time, batch testing that process might have taken me a few days. Now I can have that program tested within an hour," she said.

Although Xpediter is used heavily in maintenance procedures, Wesneski thinks the greatest productivity improvements have been with its application to on-line IBM IMS testing.

"Before Xpediter, we couldn't completely test on-line IMS programs. The only testing aid available was the Batch Terminal Simulator [BTS]. BTS does a good job of formatting your screens, of tracing data base calls, but it stopped there," he said.

"Xpediter invokes BTS, then continues on where BTS leaves off, allowing you to test interactively your way through the whole IMS program. You can stop program execution wherever you want, look at what the data is doing, change it or keep right on going . . . this combination provides users with maximum capability," he said.

# Be a Careful Shopper When Choosing Productivity Aids

(Continued from SR/19)

the coming of productivity aids, this method is no longer valid. Hence, productivity has become to DP what team spirit has long been to sports — something everybody wants, but nobody knows how to measure.

Surveys of DP managers indicate that although ways to increase productivity are actively being sought, there is no definitive way to measure the improvements. The new productivity tools make previous measurements obsolete. Because of the wide assortment of aids and their capabilities, measurement becomes even more complicated and the different ways of measuring innumerable.

Often, the best measure is user satisfaction. Software bottlenecks many times force managers to work on large backlogs instead of quantifying the benefits of the new tools.

In addition to measuring a programmer's productivity, it is also necessary to measure an aid's productivity. An aid might decrease the time required to implement a system, but if that system does not run effectively, then all the time gained is suddenly lost in trying to bring the system up to par. A balance between programmer and aid productivity is necessary.

One shop in Houston uses an informal evaluation system. It consists of breaking a project into segments, setting deadlines for each and measuring success in terms of the ability to meet the schedules. This proved awkward at first, but with time it smoothed out. The end result was a better measure for productivity. It even helps decide whether or not to use a productivity aid.

In order to be truly effective, productivity measurements must look at the total picture, taking measurements along the way as well as at the end. The method of accomplishing a task must be examined as carefully as the final result. This will result in a measurement that has taken all factors into consideration.

Such a system of evaluation will at first tend to be subjective and awkward, but the bugs will be worked out eventually. The end result will be a system that gives an all-inclusive view of a project and its requirements.

Instead of considering DP an exception, a part of an enterprise and yet totally distinct, a more integrated view is necessary. The stereotype of DP being strange and mystical must be put aside. Only then can management, using its methods of evaluation, proceed to evaluate productivity, taking into account DP and its related personnel. Only when the total picture is viewed will everything come into focus.

*Gabriel is a business student at Azusa Pacific University in Azusa, Calif.*

*Components for Success Are the Same*

# Look to Time-Sharing for Info Center Model

By Robert E. Cook
Special to CW‡

When IBM first coined the term "information center" and began marketing the concept, it seemed unlikely that the firm could know how phenomenally successful information centers would be.

At first glance, the information center seems to be just another way for IBM to get its customers to buy more hardware. Yet a concept that has no underlying economic benefit is unlikely to appeal to many people.

It seems that there are two basic views on what comprises an information center. The first is to list the components of an information center to determine compatibility. They are:

- Support for user terminals.
- Operation of a data base management system (DBMS) so that end users can access corporate data.
- Provision of some data manipulation language so that end users can do their own analyses of data retrieved by the DBMS.

*'By definition, the information center is meant for the end user who is a professional, but not necessarily a computer professional.'*

If this simplistic view of the components of an information center is accurate, almost all large corporations could say they have information centers. Most do not fall into this trap.

The second view on what comprises an information center approaches the problem from the perspective of the end user rather than from that of the DP professional. By definition, the information center is meant for the end user who is a professional, but not necessarily a computer professional.

It is dangerous to build a rigorous definition of an information center that is based on untested concepts. However, a real-life model is available to illustrate the 15-year-old evolution of the components of a suc-

*(Continued on SR/24)*

## *Just Which Operating System Is Right for You?*

What operating system should you choose for your information center?

In the IBM world, there are three strategic Series 370-compatible operating systems or System Control Programs (SCP): MVS/TSO, DOS/VSE and VM/CMS. Each has its own strengths and weaknesses.

MVS is a superb vehicle for heavy batch work and has some interactive capabilities.

MVS/TSO provides terminal capabilities both for interactive work and for launching batch jobs. On the negative side, MVS/TSO is not terribly "friendly" from the end-user perspective.

Finally, MVS is the only SCP of the three information center options that does not have support for Structured Query Language (SQL), IBM's relational data base manager, which has extensive end-user facilities.

All things considered, MVS/TSO is not a good choice for an information center operating system.

DOS is the SCP chosen by midsize firms typically running below the top end of Series 370 mainframe power.

DOS is a good batch system with an adequate interactive terminal capability. DOS' primary advantage is low system overhead compared with MVS.

On the other hand, DOS has fewer system facilities and features than MVS. With the exception of SQL, the end-user friendliness of DOS is fairly weak.

VM's popularity is relatively new. It does not perform well with batch work, but it is extremely good with CMS at interactive work, supporting three to five times as many interactive terminal users as its MVS/TSO counterpart.

VM allows multiple operating systems to run under it, which facilitated DOS to MVS conversions.

It is the primary SCP used by many commercial time-sharing vendors. IBM has begun to promote VM as its premier SCP for support of interactive work. And interactive work is the essence of an information center.

In any case, it seems clear that most successful information centers are tied to VM/CMS.

# Application Generator Mends Design Problems

ROCK HILL, S.C. — Because its system bottleneck was a design rather than a programming problem, an application generator was the ticket to productivity improvement for a fabrics manufacturer based here.

M. Lowenstein Corp. manufactures fabrics and consumer textile products sold under Lowenstein, Wamsutta and Pacific brand names in 17 plants in the Southeast U.S.

The tool the firm selected is called Gamma. It is a product of Generation Sciences, Inc., which is marketed and supported by Tarkenton Software, Inc. of Atlanta. M. Lowenstein uses an IBM 370/168 and IMS/DC software at its administrative offices.

Ralph Brannan, corporate vice-president and general manager of Lowenstein's Information Service Division, said, "After learning about Gamma, I was convinced it was a better solution than a conglomeration of programmer aids." The company installed the product in June 1982.

Gamma enables a systems analyst to maintain design specifications in an automated design manual. This manual is structured documentation, which includes system narratives and flowcharts, screen layouts, file and data base layouts, report layouts, input descriptions and editing and processing rules. It also includes reports of project status meetinga, task assignments, a glossary and all other information pertinent to the system development life cycle.

The design manual requires design work to be done up front before the programs are generated. From the final design manual, Gamma produces structured source Cobol programs of uniform architecture for the system.

Under Gamma, M. Lowenstein has developed an inventory-assignments-to-orders system and a product-spec file-control system. Because of its success with these develop-

(Continued on SR/28)

# Time-Sharing Provides Info Center Model

(Continued from SR/23)

However, a real-life model is available to illustrate the 15-year-old evolution of the components of a successful information center.

Fortunately, these components evolved under the harshest possible field-testing conditions — for instance, whether this information center service was good enough to divert substantial DP dollars from the in-house DP department or to have service provided by an outside entity totally unrelated to the spending organization.

Of course, this discussion really concerns the commercial time-sharing industry and the question of how, using the same hardware as their customers' DP shops, it managed to make billions of dollars in revenue because in-house DP could not do the job as well as it could.

The management information systems (MIS) managers who have recognized the congruence between the components of commercial time-sharing offerings and the proper components within the information center have already established an information center, or "in-house time-sharing company," and are reaping significant benefits, both monetary and political. The profits of time-sharing firms have decreased as the popularity of the information center has grown.

The major components of a successful time-sharing operation are inherent ease for the non-DP professional; rapid terminal response time; some sort of data base or file manager with an imbedded language that could be easily learned within a day or two; help by telephone from customer support personnel; and robust system support software such as disk backup, tape management, security and accounting to keep the customer from shooting himself in the foot.

If it worked for the time-sharing firm, it will work for the MIS manager because the job is far cheaper to do in-house.

The concept and its components are proven. The MIS manager just has to care for the end-user customer as much as the time-sharing firm does.

When cost justifying an information center, some hard questions have to be asked. Most importantly, the long-term savings have to be present.

In the case of the information center, there are two areas of savings. The first is in hard dollars if outside time-sharing is being used. The second area of savings comes in two parts and is a little harder to quantify.

The first part involves the size of your corporate programming backlog and how to shrink it, or at least how to slow its growth. Quite simply, if end users can do their own programming through a user-friendly DBMS tool, any backlog of work will be reduced. If one accepts that the work is necessary and will benefit the organization when completed, the information center concept is on its way to being sold since the benefit will be realized far sooner with an information center.

The second part involves the benefits of very fast terminal response in an IBM VM-based information center.

The efficacy of the information center has been proven by the commercial time-sharing industry — it works. The 10-year trend of steadily dropping costs of hardware, coupled with the availability of both end-user-oriented DBMS and extensive system support software, has made the information center available to most medium-size and large corporations.

Reaping full benefit from an information center requires MIS management to share the same commitment to excellence and support that its end users have experienced with commercial time-sharing firms. Without that commitment, it will not work.

*Cook is president of VM Software, Inc. in Falls Church, Va.*

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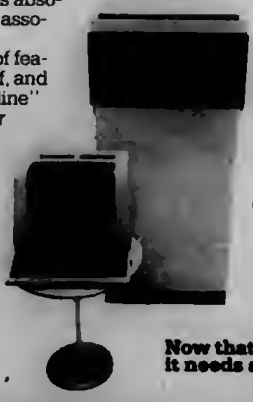

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# Generator Patches Design Problems for Firm

*(Continued from SR/24)*

ment efforts, the Information Service Division will use Gamma to develop all new applications.

"The design manual is the reason we bought the system," explained project manager Bob Reber. "It's a tremendous communications tool. So many times we put up a system that is what we thought the user said he wanted, and so many times it's not what the user thought he said he wanted," Reber explained.

"Since users don't 'speak the language,' the design manual is beneficial because we review and revise it with the user so he can verify his needs and know what we're doing every step of the way. And it's a tremendous source of documentation when we're finished. We have no technical writers." Each upgrade or change to the application automatically produces documentation reflecting those changes and upgrades.

"The design manual is useful when people are moved from one project to another," Brannan added. "It's easier to bring a new person up to speed on a system by giving him a design manual to study. It's also a management tool for project managers to monitor the progress of a system.

"Gamma provides significant savings in future projects because it enables you to lift a file design from one document and use it for another project without coding it all again," Brannan said. Only the logic section and the changed data is specified, then the program is regenerated. This takes the tedious work away from the programmer.

"We have elevated programmers to designers," he added. "They are no longer just programmers; they're handling a wider realm of functions now."

There was some resistance to this nontraditional means of developing applications," he continued. "There is a high entry fee in terms of people's time to learn to use the product and use it right."

"I think people basically resist change because they fear they won't be able to achieve what they want to," said Sandy Ransom, a project analyst who supports Gamma's use. "When you get used to it, you lose those fears. You have to have an open mind.

"The trick to working with Gamma is to generate a program and see what it does for you," Ransom advised. "You have to think Gamma rather than Cobol. I really appreciate what Gamma does when I have to code something in Cobol," she said. "Cobol requires much more work."

On-site support is provided by Tarkenton Software while M. Lowenstein's personnel learn the system. Brannan regards this assistance as essential to the success of its product implementation. The training classes and full-time support minimize the frustrations of learning a new system and are instrumental in the efficient completion of projects.

"We feel we will pick up 25% productivity, maybe 50%," Brannan predicted. "We're looking to do the same amount of work with fewer people."

M. Lowenstein does not plan to replace the people it lost and expects to lose through normal attrition last year and this year. "The cost savings of not replacing those people will more than offset the cost of the package," he said.

Reber feels Gamma is making his staff more productive than ever before. The inventory applications system was done with Gamma in 16 man-months as opposed to the original estimate of 40 man-months without Gamma.

*An Important Productivity Booster*

# Don't Overlook Automated Documentation

By Steve Kassay
Special to CW‡

People looking for productivity software often review "quick coding" products for their information and epplication development centers.

These products include report writers, query languages, application generators, program generators and decision support software.

A lot of time is devoted to reviewing these products, for several reasons. There are many vendors offering several hundred products — over 100 for IBM mainframes alone.

More importantly, it is believed that the greatest productivity increases will come from these products because end users can do their own programming and programmers can program faster.

In focusing on these tools, plus hot new topics such as corporate micros and office automation, other areas in which significant strides in productivity can be made are easily overshadowed. One such area is automating, simplifying and streamlining documentation. Can the documentation be produced more easily? Less expensively? More accurately? More productively?

Automated documentation software just might be the overlooked productivity booster for your management information systems staff — overlooked for several reasons:

- Improving documentation is not e state-of-the-art project; other areas mentioned above ere often more exciting.
- Gains made in improving documentation ere not readily visible to top corporate management.
- Programmers, as a general rule, dislike documenting.
- There eppeers to be a common belief that the "documentation problem" is unsolveble; it is just something you live with.

It's true that documentation is not very exciting or state of the art. It is more important than that. It is a necessity for operating e data center and providing the services that users require.

Automated documentation software can:

- Increase productivity by eliminating labor-intensive manual documentation.
- Ensure that documentation is up-to-date and accurate. Manual documentation, if available, may be out-of-date or incomplete.
- Aid in standards enforcement.
- Be an integral part of disaster planning. The finest backup facility in the world is useless if your documentation is incomplete, inaccurate and out-of-date.
- Improve the ease of auditing systems and programs.
- Streamline preproduction review, daily operations and maintenance.

Documentation deficiencies are not going to correct themselves or go away. Is the mainframe hardware being downgraded? Is the number of mainframe applications declining? Is the backlog of applications shrinking? Is the need for automated documentation decreasing? Of course not.

Documentation software can be divided into two general categories: language-specific and language-independent.

The latter may operate from your job control language or object libraries to provide system documentation such as flowcharts, run documentation, cross-references and various file relationship/analysis reports.

*Kassay is a consultant and has been in the computer business for 15 years as a programmer, analyst and marketer.*

# Software Smooths Way for Bank's Conversion

ALBUQUERQUE, N.M. — Making a major conversion from a non-IBM data processing shop to an IBM environment is a DP manager's nightmare. But Albuquerque Federal Savings and Loan Association (AFSL), New Mexico's second largest financial institution, managed that task in 1982 despite tough economic times for financial institutions.

In October 1981 a project team was assembled for the conversion consisting of six consultants and five AFSL data processing staff members, according to Rupert D. White, systems package specialist. The project's completion date was set for December 1982. That included selection of hardware and software as well as installation and conversion of all current files, White said.

The first system configuration for initial development consisted of an IBM 4331 and eight IBM 3340 disk drives. However, two major problems remained: The project team needed resource management software and training. AFSL selected Applied Data Research, Inc.'s (ADR) ADR/Roscoe and ADR/Librarian because they promised minimal resource consumption and easy installation and use, White said. ADR also provided initial training.

In January 1982 the development configuration was set up in a small office space in AFSL's main branch. Upon completion of the system generation, AFSL realized it was almost out of room. Then ADR installed Roscoe and the Librarian. By immediately freeing space on three disk packs, Roscoe was available within four hours.

"Productivity was amazing," White said. In the first week of April 1982, AFSL upgraded to an IBM 4341 Group 1. Files on the eight 3340 disks were transferred to four 3375 disk drives. By April 15, the payroll and general ledger systems were in production on the new configuration, White noted.

The Roscoe Programming Facility (RPF) was a great time-saver, White said. RPF is an interactive Basic-style programming language that enables the execution of programming logic and almost all the commands known to Roscoe. "The generation of job control language (JCL) and data, as well as the ability to modify them to fit specific yet repetitious needs, became a breeze," White said.

On-line screen generation to facilitate input of variable information used to tailor JCL was easily accomplished through a Roscoe facility for creating and using panels, he added.

### Conversion Problems Solved

General ledger conversion problems were solved by the RPF programs. Since most of the operations staff maintained the daily operations until the conversion effort was completed, AFSL wrote RPF programs to drive multiple options available to the general ledger system, White said. JCL required to invoke the options and reports was generated, modified and finally submitted by RPF programs.

Other utility RPF programs were used to convert application programs from the old system to the syntax rules on the new system. JCL and submission of all compilations were accomplished through panels and RPFs. Routines were written to generate multiple Roscoe commands that could be invoked by a single command.

"The impact was dramatic," White said. "AFSL beat the targeted completion date for the entire conversion by three months."

AFSL has continued to realize productivity gains from Roscoe's RPFs, White said. The tape management system currently in use by AFSL employs RPFs to ease the use of complex interactive command formats. The tape library batch and on-line maintenance routines are now driven by RPF programs. Additional access security is built into the routines.

The Librarian master files at AFSL are now accessed using RPF routines that include enforcement of site-specified standards and additional levels of security. Batch reporting options for the Librarian can easily be selected from menus allowing the modification and submission of the JCL required to satisfy requests of authorized users, White said.

ADR also has supplied on-line tutorials that walk users through the terminology, concepts and use of each command. A search of the Roscoe source library supplied with each release explains other useful RPF routines to aid in library maintenance, catalog monitor routines and utility routines, White said. RPFs are even provided to aid in installation of Roscoe releases.

Since Roscoe was installed, company plans have been revised to include development of RPFs to aid in production, control and enhancements of the tape library routines and the Librarian routines already in use, White said.

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*Development Time Reduced*

# CICS Tool Allows Company to Cut DP Staff

SALT LAKE CITY, Utah — By introducing an applications development tool in an IBM CICS environment, Steiner Corp. here has cut its staff from three programmers to two while reducing development time from weeks to days, according to company DPers.

Steiner began looking for a CICS productivity tool early in 1982 when it expanded leasing operations from here to Phoenix. The data center here was not able to meet the demands of the remote leasing operation using batch programs. "There was not enough time to write an online system in command-level Cobol," DP manager Glenn Sorenson said.

Steiner evaluated two major tools before selecting SGT from Future Software, Inc. According to Ward Sutton, Steiner's systems programmer, "We tried [IBM's] DMS. It took us two weeks to get one application up with IBM's help. We can do the same job now with SGT in less than an hour," he said.

"Then we tried [Oxford Software Corp.'s] UFO. UFO was good for simple programs, but the length of the code grew exponentially with increasing program complexity because we had to pass more and more switches from one exit point to another." Sutton said that as programs grew more complex, response times sagged for all programs running concurrently. Average response time was about 40 seconds.

Sutton and Sorenson then attended a demonstration of SGT and decided to evaluate it as a beta test site. "We got our first SGT application up in about a day," Sutton said. "When we converted our UFO-generated applications to SGT, average response time went down from 40 seconds to five seconds. Response time on ICCF [Interactive Computing and Control Facility] running concurrently improved from about 40 seconds to two seconds."

**Fewer System Resources**

Sutton said SGT saved the department from having to upgrade hardware because it used fewer system resources. "For example, SGT has facilities to prevent unnecessary retransmission of data already displayed on the screen, reducing [IBM] Vtam overhead and increasing teleprocessing line capacity," he noted.

Programmer Dave Grawrock said he taught himself to program in SGT in a few days. SGT lets him develop complex programs quickly, he said. For example, it took him two hours to write an SGT application that updates four files. "Because of its complexity, I wouldn't even attempt that one in UFO," he added, "and I'd be lucky to be able to do it at all in Cobol."

Grawrock said that when he recently converted a file layout from one format to another, it took half an hour to convert the SGT programs that access the file, while in the past it has taken more than two weeks to convert four batch programs that access the same file.

SGT programming is faster than Cobol programming in large part because SGT programs are compiled incrementally as soon as they are entered, Sutton said. Syntax and field resolution errors are detected immediately. The programmer does not have to wait for a batch compile job to be scheduled, and programs can be run as soon

*(Continued on SR/34)*

# Mumps' Flexibility a Tonic for VA Hospitals

ALBANY, N.Y. — Proponents of a language that comprises data base facilities were able to prove to a government agency that the combination of this software and minicomputers would be less costly and more productive than the planned usage of mainframes and Cobol.

In April, the General Services Administration approved a Veterans' Administration (VA) request for procurement authority for decentralized computer systems using the Mumps language. The approval represented a significant milestone for a grass roots campaign within the VA, referred to by some as the "VA Mumps Underground Railroad."

One of the original members of this group is Dr. Joseph Tatarczuk, who now heads the Northeast Region Verification and Development Center (V&D) in Albany. One of six such regional centers in the nationwide VA hospital system, the Albany V&D Center has been instrumental in laying the track for the Mumps ride to daylight.

Tatarczuk, who has a Ph.D. in nuclear physics, joined the hospital in 1972 to work in nuclear medicine. "We were doing state-of-the-art research using state-of-the-art computers — for that time — and writing our own software because you couldn't buy it. I went to the medical environment and found it to be archaic. They were doing everything by hand," he said.

After setting up an effective nuclear medicine program, he said, "We looked around and thought, 'now what can we do for the hospital.' " The hardware available was a Digital Equipment Corp. PDP-11/40. The software had to be easily modifiable, relatively inexpensive and user-driven so clinicians could converse with the machine. The solution was Mumps, and it was a solution arrived at concurrently at several VA hospitals.

Tatarczuk explained that Mumps is a language, but that it also includes operating and data base systems. The simplicity of its structure has al-

*(Continued on SR/34)*

Dr. Joseph Tatarczuk

# Real Estate Lender's CICS Package Mows Costs

JACKSONVILLE, Fla. — A computer firm is helping real estate lenders cut administrative costs where they are highest: loan processing.

Computer Power, Inc. (CPI), a subsidiary of Chase Manhattan Bank, provides a full range of data processing services for 120 lending institutions with 3.7 million loans processed daily.

In the fall of 1982, Bill Barbour, CPI's vice-president of new products, began developing an on-line data entry system to supplement the batch system already in use by CPI clients. Barbour was faced with a requirement to develop 200 screens to accommodate approximately 400 programs with minimal CICS programming resources. And the project had to be completed by mid-1983.

"My choices were clear," Barbour said. "Either hire more of those hard-to-come-by CICS programmers or find a proprietary product that would generate large numbers of screens in a short period of time.

"I had some previous experience with code-generating software packages," Barbour recalled, "and I knew I could get leverage by having a standard logic with all the programmers writing the same code. That kind of leverage was essential for completion of the system by the deadline."

In the search for the tool to set that standard, Barbour and Roy Fileger, CPI's vice-president of technology, learned of Accolade, an application development system from Multiplications, Inc. of Cambridge, Mass.

Accolade insulates programmers from any required knowledge of CICS, Barbour said. It is on-line and menu-driven, designed for users of IBM or plug-compatible mainframes auch as CPI's National Advanced Systems, Inc. 9070.

CPI installed Accolade in late November. "We spent about a month learning Accolade and all its capabilities," Barbour said. "In late January,

*(Continued on SR/36)*

# Mumps a Relief for VA Hospitals

*(Continued from SR/33)*

lowed the relatively few VA programmers to develop a modular system of software that can be implemented piece by piece as hospitals build computing capacity and install more terminals in different departments.

The language's adaptability allows dynamically changing information to be entered by clinicians and become part of the programs.

Some 35 VA hospitals are now running part of the modular data systems that Tatarczuk helped design. The basic "core" modules include registration and admissions, discharge and transfer, patient profile and outpatient pharmacy. The "full core" also includes laboratory and in-patient pharmacy modules. It is this full core that comprises the first phase of the installation, now being bid upon for the entire 172-hospital VA system.

When the VA hospitals are expanded to full core, they will also get additional terminals and printers. Tatarczuk's own Albany system is at this stage. A complete order-entry, patient-data look-up module is now being put into place in all of the medical centers' wards.

Other modules being worked on include radiology and nursing service. Many modules, including psychological assessment, dietetics and engineering, are currently running at various facilities.

"Right now, Mumps is the only way to do it," Tatarczuk said. Along with File Manager — a programmerless applications driver developed by George Timson of the VA District Office in San Francisco — Tatarczuk believes that Mumps lends a unique flexibility to any analytical data base.

"Because of our environment and our restrictions — how much money and equipment we're going to get — I don't know where we're going to be three years from now. But right now, I don't see anything else that can meet our needs."

# Firm Cuts Staff With Utility

*(Continued from SR/32)*

as they have been written.

Using SGT, Steiner has developed its own security system with utilities for the system administrator to maintain an authorization file, a menu file and a screen image file. Each user logs onto the private menu of programs he is authorized to run.

"SGT enhances CICS security," Sutton said. "It has the ability to have multiple transportable libraries, each of which has its own user/password combinations. It also has a key-lock structure that determines whether one SGT user may or may not access another user's programs, maps, files or data."

Two programmers needed only three weeks to write a whole leasing aystem, comprising 25 programs, more than 50 screens and about 2,500 lines of SGT code.

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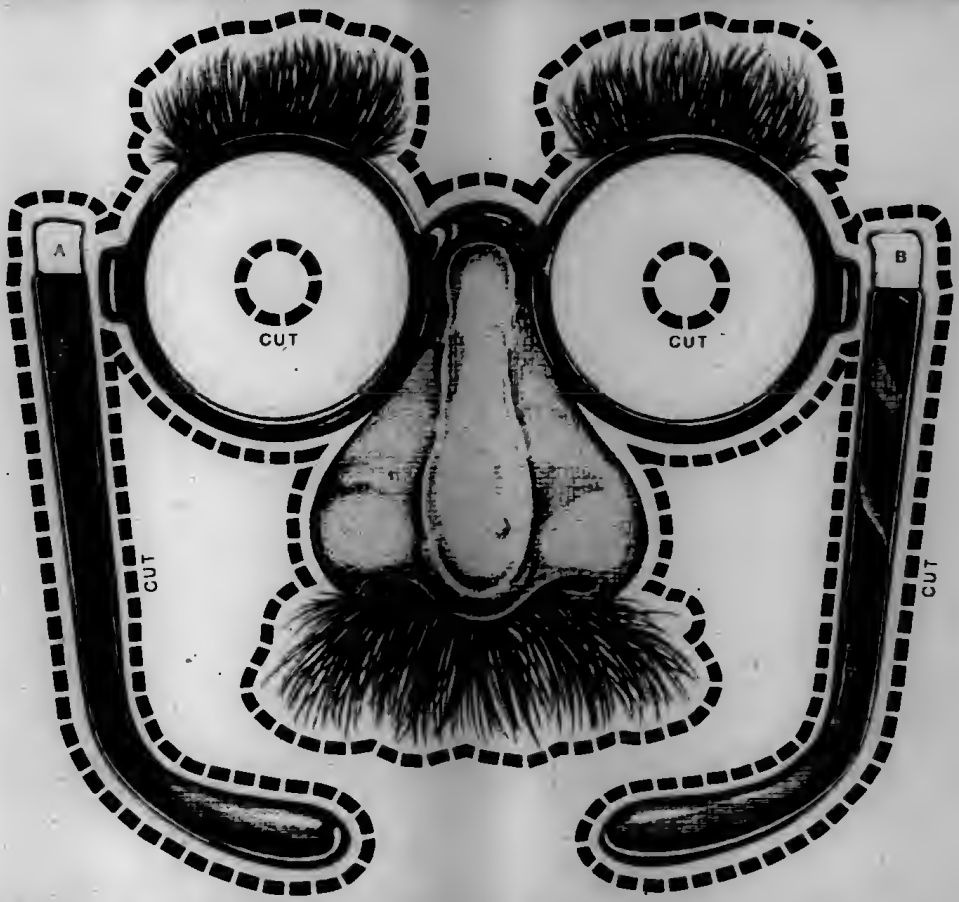


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1 *Datapro* "User Ratings of Proprietary Software-COMPLETE" November 1982 2 *Computerworld* December 20, 1982

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*Vendor Uses Development Tool*

# Package Aids Conversion to CICS Environment

OKLAHOMA CITY, Okla. — Converting its oil and gas accounting package to run on IBM mainframes was out of the question for a software vendor here until the firm brought in an applications development tool.

Petroleum Software Systems, Inc.'s Integrated Petroleum Accounting System/100 (Ipas/100) was developed and marketed primarily in minicomputer environments in which applications development tends to require less programming overhead and the end user has more control over the final result.

The IBM CICS environment, however, required not only a tremendous amount of programming resources, but extremely specialized programming skills as well.

For these reasons, converting to an IBM CICS environment was impractical, according to John R. Lee, communications director.

In June 1982, the firm learned about Progressive Software, Inc.'s Progressive Application Development System (ADS), which provided a method of developing business applications under CICS in minutes. Following a thorough demonstration of the products' capabilities, Petroleum Software Systems decided to sign a contract with Progressive Software and attempt the IBM CICS conversion of Ipas/100.

The biggest obstacle to conversion centered on the development of 133 screen applications. The screens needed to look just like the ones that were being processed in the minicomputer environments. "We also needed to be able to define and process those screens under IBM CICS using programmers with little or no CICS expertise," Lee explained.

The installation of Progressive ADS required the on-line table range file, the screen file and a data collection file. The file control table requires three entries (more if there is more than one data collection file required); the program control table requires two entries; and the program processing table takes four entries.

*(Continued on SR/40)*

# Utility Helps Realty Lenders Cut Costs

*(Continued from SR/34)*

we got down to work and were actually creating screens and programs with Accolade."

### Adjustments to Be Made

There were some adjustments to be made. The typical Accolade user writes different applications for a single company. In CPI's service bureau environment, the requirement was for a single application for many companies.

"When you buy packaged software, not everything is going to fit perfectly," Barbour explained. "What's unique about Accolade is that the package includes the capability to make modifications easily."

Using Accolade, CPI's programmers were able to write code that enabled many customers to use different files for the same application at the same time. "In other words, the application knows what customer it's working with, what files to go to and what security measures are required," he said.

The five programmers developing CPI's data entry system have generated 150 screens to date — about one screen with its associated processing programs per programmer per day. "Using conventional software development tools, it would take one of those same programmers eight days to generate one screen," Barbour said.

CPI offers the real estate industry its Mortgage Servicing Package (MSP) as a way to control the costs of servicing mortgage loans. The 120 financial institutions using MSP have the lowest personnel costs per loan serviced in the real estate industry, Barbour said.

Under the current batch system, a typical customer processes all of its loans on a daily basis. The customer and its lockbox bank send records of payment to CPI daily. Those payments are posted and the loans processed that night at CPI's data processing center. The processed information is returned to the customer via CPI's data transmission network in time for the next workday.

The new data entry system, brought up under Accolade, will provide CPI customers with an on-line feature that preprocesses and validates transactions. The enhancement will move data entry from the keypunch room to the desks of the client's personnel.

"Our client list continues to grow," Barbour said, "hence the requirement for a data entry system." Barbour credits Accolade with his ability to respond to that requirement quickly.

# Interpreters Useful in Applications Development

By Clayton Parkhill
Special to CW‡

Interpretive facilities offer a broad range of assistance for the generation of applications code. But they have been plagued with a variety of stigmata. Slow operation and execution, severe flexibility problems and awkward operations are just a few of the traditional objections.

Let us examine the reasons for these notions and try to arrive at the proper place for interpreters in the commercial environment. The following is an analysis of logical groupings in which products are associated by intended function:

• **Management query processors** were designed to offer the nonprogrammer or nonanalyst an interface to information stored in the DP domain. These interfaces are able to interpret a set of requests that are solicited through prompts. The user need not know any of the particulars of a language.

The interactive management query facility is truly an interpretive facility with widespread application. The programming department is relieved of the responsibility of generating one-time reports and query requests in that the users may service their requests independently. This form of nonprocedural interpretive facility is an essential component of any interactive environment.

• **High-level programmer interfaces** are other forms of interpretive facilities that provide significant benefits for the creation and execution of programmer coding. But while offering a high-level interface for the programmer/analyst, these tools fall short in terms of flexibility.

The programmer is often forced to return to conventional compilers because the high-level language lacks the provision for more advanced programming facilities. The high-level programmer interfaces are constantly being improved and may eventually become nonprocedural interfaces for nonprogramming personnel.

This will most likely be accomplished through the addition of front-end logic for prompting the higher level interface.

Unfortunately, interfaces for the high-level interpreter may lose most of their functionality in that they were not developed for that final purpose.

• **Interpretive procedural language interfaces**, are clearly in a conceptual area that will continue to endure as a means to create and execute coding without the use of batch-oriented utilities. The flexibility and functionality of the traditional approaches are preserved through the language and command set, and the time-consuming batch-oriented functions are eliminated.

*'Interpretive procedural languages are extremely powerful ... however, the interpretive execution of batch-oriented functions has been typified as slow and inefficient.'*

Interpretive procedural languages are extremely powerful for the development process and testing phase of the initial implementations of applications code. However, the interpretive execution of batch-oriented functions has been typified as slow and inefficient.

During the execution of batch programs in the production context, interpretive compilers may offer less than desirable performance due to the inherent overhead of the interpretation of the com-

(Continued on SR/42)


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By Reality District
Cary, NC
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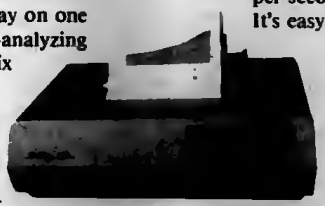

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*'Reduces Complexity by Reducing Scope'*

# Component Software Ideally Suited for '80s

By Charles M. Robins
Special to CW‡

Due to advances in communications and networking, a software system is no longer restricted to a single computer but is now being used on a combination of mainframe and microcomputers.

Further, new technologies are adding to the complexity of software, which means that it may take 10 times the resources to produce an acceptable product in this new era than it did before. This is particularly frightening when one views the development backlog facing most organizations' DP departments. Yet user expectations have risen, and there is an unrelenting demand for new functions.

What is needed is a way to reduce the complexity of development and maintenance in this environment, to maximize the productivity of developers and allow the evolution to distributed processing, multimachine environments where integration of mainframe data processing with local processing, graphics and so forth is a necessity.

But the software industry still finds itself tied to the sins and architectures of the past. Well over 80% of many software efforts still go into maintenance. And new technology and innovations cause existing software to age rapidly, reducing software life expectancies. In poorly constructed software, each new feature added is an agony of integration.

Productivity is not the issue of lines of new code, but rather of leverage: minimum development time, maximum features, longest life cycle, greatest flexibility for change, a minimum of "bugs" and omissions and easiest testing. Another key issue is reusability. If a major part of one application development effort applies to another, then tremendous savings are realized.

A concept ideally suited to software development in the '80s is "component software." This consists of general-purpose software subsystems, each optimized to perform a specific function-set, built to be called from applications and to be used with one another. These components are usable by many vertical (business) applications, but are intended to provide one key general function.

Component software works in the same manner as component stereos, which allow new components to be plugged in if they are built with the

*(Continued on SR/44)*

# Utility Aids Vendor's CICS Conversion

*(Continued from SR/36)*

All of the table entries are copied into the appropriate CICS table via COPY statements to facilitate table maintenance. Progressive ADS phases are linked into the CICS core image library, CICS is brought down to bring in the new table entries and the installation is complete.

Since the screen applications were viewed as major obstacles to the conversion process, Petroleum Software Systems began using Progressive ADS immediately to build screens. A brief training session and documentation overview was all that was required to make effective use of the tool, Lee said. So one of the firm's non-CICS programmers was assigned to bring up the applications.

"In less than a month and a half, all of the 133 Ipas/100 screen applications were working. The screens on the IBM both looked and functioned identically to those we were using on other machines," Lee reported. All of the 133 screens currently are being used on the firm's and its clients' IBM Series 370 systems running under CICS, Lee said.

Development of the screen applications was performed by positioning text fields, screen edits, delimiters and other screen conventions on a blank screen as desired. The screens were then assigned as either data collection screens or on-line screens. Security was determined by a series of questions about the screen that Petroleum Software Systems answered in regard to what it felt the user should be permitted to do with the data presented on the screen and the screen itself.

"One of the highlights of the screen-building facility is that it will always let you know what has happened after each step of the screen-building process. This allowed us to make any corrections necessary before we were allowed to go any further," Lee said.

Once the screen was defined and the security determined, the screen could be viewed immediately in a formatted mode ready to be used. Progressive ADS also supported the building of browse screens in which multiple records could be entered and updated at one time.

In addition to the screen-building facility, Progressive ADS provides a file-handling facility in which any files can be verified and displayed, including files not defined to CICS.

"We have been very pleased with the flexibility and resource efficiency of Progressive ADS," Lee said. The tool itself consists of three modules that reside within the CICS nucleus, each of which is under 32K bytes.

"Compared with other applications development tools we have looked at, this is a minimal amount of machine resources," he added. "The relatively small machine demand is the reason for the extremely fast response time we have become accustomed to. Progressive ADS will outrun any of the applications development products we have experienced and display information from as many as nine files at the same time."

Petroleum Software Systems' experience with the documentation, training and support for the product also has been very good. The documentation provided is in a step-by-step format similar to a cookbook. "You are told in simple English how to do a particular thing, and if you want to add or change something, you can just turn around and try it. If it doesn't work, the system will let you know what you have done wrong," Lee said.

# More good news for these Fortunate 500.

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Pace Financial Management
Pacific Resources
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Penn Chamber of Commerce
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# Interpreters Have a Place in DP Environments

*(Continued from SR/37)*

mand set as the program executes. Traditionally compiled programs may in fact execute from 50% to 70% fewer instructions for the same functions than the interpreters.

It should be recognized that all compilers are interpreters. The interpretation takes place not only when the compilation takes place for the generation of object code, but also at execution time.

The fact is that most compilers are interpreters for the generation of machine-executable object code, whether it be at runtime or at compile time that the actual expansion of the code takes place.

● **Operating systems** are interpreters in the purest sense of the term. The basic characteristic of all operating systems is provision of interfaces to the various resources offered in the system.

All I/O is performed through the use of high-level systems calls that are interpreted for performing the actual physical I/O. The I/O request must be analyzed by the operating system for a variety of functions that are clearly interpreted at runtime.

The file must be opened, for instance, and the appropriate subroutines must be called by the operating software for the proper service of the higher level programmer request.

In addition to this, the indexes must be properly associated with the physical data for the access request to be further interpreted into a physical I/O request for the proper positioning of the heads on the disk drives.

● **Low-level coding generators and object generation utilities** produce executable object code at the program intialization phase of execution. These facilities offer the user an ability to code in a high-level language without the batch compilation processes. Generally speaking, the high-level coding generator is used for utility functions.

These interfaces may execute through the use of various subroutines called by the language at runtime or may actually generate the object code for all functions as a first step in the execution of the desired program.

They are generally excellent tools for normal maintenance functions, such as repairing a file on disk, extracting information on specific programmer-requested criteria and other batch-oriented procedures.

● **Interactive systems approaches** are a somewhat less definitive area of interpretation. Tools such as teleprocessing monitors and data base management systems should have a certain level of interpretation inherent in them.

Screen drivers, file access facilities, security systems and other environmental interfaces are typically parameter-driven and tailored through a high-level selection process by the system user. These facilities may be oriented to the end user, producing the user-friendly interactive environment.

The advent of the microcomputer and versatile minicomputer has given the mainframe community cause for concern.

The decision to take these alternative directions is primarily due to the inflexibility of the large-scale DP environment and the lack of availability of easy-to-implement interactive development.

● **Interpretive applications generation facilities** are sure to be the salvation for the centralized mainframe communications-oriented applications environments. These facilities will not only have the traditional screen drivers and security systems — they will require high-level interpretive interfaces for building applications coding formerly left to batch compilers.

These functions, although an extremely small portion of the execution of the applications, are almost universally left to the mercy of batch-oriented compilers and a host of batch utilities.

The functions are typically difficult to use and require a vast amount of systems resources for scheduling and execution.

Serious production environments need more expeditious methods for the solution to the development problem.

The solution is really quite simple. The large-scale DP environment must use real-time implementation tools for the installation of real-time systems.

This means taking the next logical step for real-time interpretation of user and analyst requests: the interpretive applications generation facility. The missing link, the last batch-oriented step in interactive systems development, must be interpretive.

User-written applications code in the better teleprocessing environments is but a small portion of the actual executable logic. The consequence of using an interpretive, compilerless facility for the creation of the application-dependent interface is nominal if performance is the consideration.

Computer time and man-hours for coding, testing and maintenance functions are dramatically reduced. Simply summarize the resources spent on compiles, link edits and other batch functions related to your on-line system, and you will be amazed at the potential for use of interpretive development facilities with the interactive environment.

*Parkhill is vice-president of marketing at Century Analysis, Inc., a Pacheco, Calif., corporation specializing in systems software and productivity tools, communications and networking and office automation.*

> *'The advent of the microcomputer and versatile minicomputer has given the mainframe community cause for concern . . . primarily due to the inflexibility of the large-scale data processing environment and the lack of availability of easy-to-implement interactive development.'*

# Navy Sails Smoothly With Programming System

WASHINGTON, D.C. — The U.S. Navy had to sail some rough waters when it built Ship Alteration Financial Information Reporting and Evaluation (Safire). The dilemma was how to build a complex application when it was unsure of the production environment in which Safire must operate.

Naval Sea Systems Command (Navsea), based in Crystal City, Va., needed the new financial tracking system to support its Fleet Modernization Program. Safire would assist Navsea in budget planning, funds obligation and expenditure monitoring involving the $1.5 billion that is allocated each year through the Fleet Modernization Program for alterations to more than 600 U.S. Navy vessels.

The system also had to meet the challenge of operating across multiple incompatible DP environments. The hardware environment for the new system at Navsea had not yet been procured. And since government procurements can often take several years, there was no certainty as to what hardware the system would ultimately use.

Further complicating the issue was the fact that the new system had to operate at eight shipyards using several different hardware and software systems.

### Traditional Solution Rejected

Navsea considered the traditional solution of rewriting the system in-house and then converting it for each new environment. However, this solution was soon rejected because it would be prohibitively expensive, time-consuming and risky.

After carefully evaluating the alternatives, Navsea chose to develop the Safire applications using software from Sage Systems, Inc. The cornerstone of Sage's software is the Advanced Programming System (APS); which boosts programmer productivity in data base/data communications applications development.

Sage's Multiple Target Option (MTO) enables applications to be portable across a range of hardware and software configurations, a spokesman said.

Using Sage technology, planning and budgeting subsystems for the Safire project have been implemented at the Office of the Chief of Naval Operations in an IBM OS/MVS environment. At Navsea headquarters, two on-line subsystems — funding and authorization — operate on a Prime Computer, Inc. Prime 750.

The customer order documentation system module has been installed on a Prime 550 and a Prime 750 at the Navy's Philadelphia and Mare Island, Calif., shipyards, respectively. Installations are planned for Long Beach, Calif., and Norfolk, Va., on Prime 550s and for Pearl Harbor, Hawaii, on Digital Equipment Corp. equipment. The Charleston, Va., shipyard will have an interim Amdahl Corp.-based system, with the ultimate installation projected for a Prime computer.

Safire utilizes advanced networking technology that allows Navsea's Prime 750 to communicate directly with the Philadelphia shipyard's Prime 550 computer.

"Funding approval used to take three or four weeks," commented Roland Perino, director of fleet modernization in the financial management division. "Now, the same job can be accomplished in a matter of minutes."

Navsea project leaders estimate

*(Continued on SR/45)*

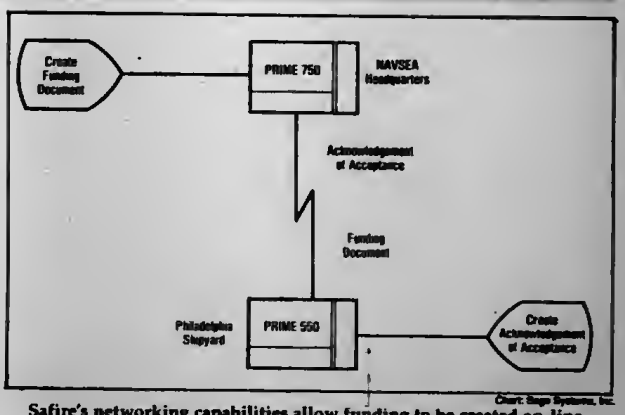


Chart: Sage Systems, Inc.

**Safire's networking capabilities allow funding to be created on-line.**

# Tips for Employing Component Software Techniques

Component software can be employed even in simple applications. Consider an investment analysis system to illustrate local processing on micros, as well as to integrate general functions with specialized applications.

The first step is to "decompose" the investment application. The data base is updated locally or from a mainframe data base. Locally, a user selects a subset of records, reports on a stock or group of stocks, analyzes data and graphs results.

The following illustrates the component functions:

- Data entry, screen handling, field edits and multiple-screen control for data input and maintenance.
- Data update accessing host records and moving to local data base.
- Data dictionary facility.
- Subset selection/sorting facility to extract and sort a set of records.
- Data analysis and aggregation system allowing totaling, averages, distributions and more complex calculations of data or a subset of data.
- Column-select reporting to allow a report over a set of records for "break" and "subbreak" logic.
- Form reporting for reporting data in an individual record.
- Graphics interface.
- File tracking and handling to track files, categories, status and content and to allow movement, group access and deletion.

## Component Software Suited For Development in '80s

*(Continued from SR/40)*

correct interfaces. Each component can be packaged neatly and optimized, while the "core" software of the application is insulated by replaceable components that can be upgraded as new technology emerges.

This method reduces software complexity by reducing scope. It replaces monolithic integrated systems with interfaces and profiles, provides general-purpose "horizontal" functions and insulates applications from changing technologies and equipment by providing a single point of contact with the computer and operating system.

Productivity improvements are dramatic because development costs and time, testing and optimization improve exponentially with reduction of scope. Development of interfaces is only a linear cost, and general-purpose software can be used by many applications. Single-point-of-contact improves transportability, upgradability and the overall software life cycle.

Another hidden improvement is that properly defined interfaces and profiles reduce tasks that would otherwise require specialized knowledge, such as video, communications and data handling, to simple specifications. Component software handles the rest.

There are four types of components: distributed processing/communications, data handling and presentation, data collection and video handling and end-user tools and aids. In all, there are literally dozens of components for file transfer, communications, data entry, forms handling, report generation and others.

Each component is meant to be small and complete. These can then be optimized for function, completed quickly and tested thoroughly. The problems of fast-growing large systems are reduced by creating interfaces designed so that one small component can function in conjunction with other components.

For example, a local microcomputer might utilize data entry software to gather information, use distributed processing software to move data to a host computer, receive data from a host computer and use local report generation to produce customized reports. To do this, however, requires ease of use, flexibility and the capability to integrate components easily into applications software and specify to each component how it is to perform.

Component software, which stands between operating system and applications software, utilizes profiles and procedural interfaces. Profiles exist for each component and specify all information needed to customize the function of the components.

*Robins is vice-president of software development for Rabbit Software Corp. in Malvern, Pa.*

# Henco Cuts Development Time With Generator

SELMER, Tenn. — There's a good chance that the kid at your door raising money for the school band is backed by a multimillion dollar company and tracked by a sophisticated data processing system.

Henco, Inc., which has cut over 80% of its program development time on most projects with the use of a Cobol program generator, is one such firm.

Henco assists schools, sports teams and other organizations in a kind of grassroots fund raising — enlisting participants to sell Henco products in the community. The company offers a catalog of items, such as shampoo, paper products, lightbulbs, candy, cleaners and candles.

The legwork is done by students, little leaguers and other budding canvassers who work in conjunction with a regional representative.

In the past few years, Henco has increased its sales at the rate of $6 million annually and is now a $35 million business, According to Eddie Kuykendall, DP manager, Henco places a strong emphasis on data processing, particularly in the area of sales performance.

Henco has an NCR Corp. 8430 with 1M byte of main memory and 243M bytes of on-line disk storage. The company also has 13 terminals located throughout the facility. Kuykendall's staff

*(Continued on SR/48)*

# U.S. Navy Cruises With Tool

*(Continued from SR/43)*

that use of APS software has resulted in productivity gains of 25% to 40%. During the detailed design phase, APS screen and report-building components allowed user involvement in prototyping sessions.

"Because of APS, overnight turnaround on changes were the rule rather than the exception," Perino said.

APS has also been valuable in the coding process. The system is written in APS's Cobol-based structured programming language, which is processed by a precompiler and translated to structured ANS-Cobol.

The APS structured programming techniques enabled Safire programmers to cut down on overall coding time and reduce errors and test shots, Perino said.

APS also offers a standardized format and structure for all programs in the system. Perino estimated that the life-cycle maintenance requirements for the Safire system will be reduced by as much as 50%.

Using MTO technology, Safire is portable across incompatible hardware and systems software environments, Perino said. A single program coded using APS can be automatically generated into two or more different versions which will run, for example, on IBM/OS/CICS, Cullinet Software, Inc.'s IDMS and on the Hewlett-Packard Co. HP 3000/View 3000/Image environments.

Initial development was done in an IBM OS/MVS environment using APS technology, Perino said. Subsequently, when Navsea purchased a Prime 750, the system was moved to the new environment without the conversion headaches and costs that normally accompany such a move.

The portability features of Sage's software also protect the entire Safire system from early obsolescence, Perino noted. Versions of Safire application programs will be compatible with new computer hardware, operating systems, data base management systems and teleprocessing monitor releases.

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# Automated Documentation Speeds Analysis

NEW BRITAIN, Conn. — The use of a Cobol cross-reference tool has quickened the program analysis process for a manufacturer here.

Fafnir Bearing Fafnir, a division of Textron, Inc., was in the position of installing a new data base structure with a team of Fafnir personnel and contract programmers.

Fafnir's people were not totally familiar with the more than 1,000 Cobol programs in production, and the contract programmers had no knowledge of the programs at all.

For the project to be successful, the team needed a quick and effective way to gather information about the use of data.

### Twofold Need

The need was twofold. First, because data field characteristics were being changed, each field on the data base had to have its use identified throughout all programs; and secondly, data and logic flow had to be clearly layed out at the individual program level.

To satisfy the need, a package was found that would operate on Fafnir's Sperry Corp. 1100 series computer. That package was the Data Correlation and Documentation (DCD) II Automatic Cobol documentation system from CGA Software Products Group, Inc. of Rockville, Md.

During the 30-day trial, DCD II was able to report field usage throughout entire systems of programs. However, the other requirement for data and logic flow within a program was not as easily met.

"Although the program-level portion of DCD II worked," recalled Larry B. Rappaport, manager of systems and programming, "having used a similar package before, I knew that there was room for improvement in the [Sperry] version."

Working closely with Fafnir's data processing people, CGA made changes to its package and improved the Sperry version significantly. The resulting product was purchased by Fafnir, and installation was easily accomplished by Fafnir's own personnel.

The project to change the data base structure was undertaken to make all updating to Fafnir's records take place in a centralized update procedure. It was therefore important to know where each field was updated throughout the many programs that accessed the field.

Since detailed knowledge of every program was not available in the programming department, some research tools were required to gather information. Those tools were found in the system-level reports, file and data analysis from DCD II.

The reports were clear and complete, enabling the project team to track down all references to every field. Field names do not have to be the same in each program for the system level reports to work, although in Fafnir's case the field names were consistent throughout the systems.

After the structure change was implemented, these system-level reports were still used to investigate problems that appeared.

"After the new system was in place, it was important to be able to identify and resolve any problems quickly," recalled Lewis Olva, manager of technical services. "And the system-level reports enabled us to zero in on any data-related problems

*(Continued on SR/50)*

# Cobol Generator Helps Fund-Raising Firm

(Continued from SR/45)

includes a programmer/analyst, a Cobol programmer and two computer operators.

Henco has developed its own purchasing, inventory control, order processing and accounts receivable software.

While looking for new productivity tools in 1981, Kuykendall saw a demonstration of Cogen, a Cobol generator from Bytel Corp., by its author, Dan Pines.

"This one so obviously fit our needs that I bought it on the spot," Kuykendall recalled.

Written in RM/Cobol, Cogen allows programmers to "paint" screen displays and output formats. Henco now uses Cogen to help produce many of its application programs. DP personnel are now experimenting with program generation on microcomputers, Kuykendall said.

"In the past, we've had to spend a week or two writing the file maintenance and report programs just to test a new system," Kuykendall explained.

"Cogen facilitates this in a matter of a few hours. You generate the file maintenance program, which allows you to enter the data immediately. You then write a report program to check the formatting quickly," he said.

The staff can quickly write procedures that test and maintain the output of more elaborate programs, he noted. Once the system is up, the file maintenance program becomes an application in its own right.

"We've reduced the time it typically takes to develop such a program from two or three days to a couple of hours," he said.

### Development of System

A Cogen-developed application, completed in the fall of 1981, involved the development of a brochure entry and reporting system to report the results of a fund raising program back to the customer.

Kuykendall explained that students going door to door are armed with sales brochures that describe the products and include an order form to record sales on the spot. The sales brochures are collected and sent to service bureaus where they become the basis for a detailed report to the school.

"We contracted with a service bureau because the drain on our In-house resources would have been too much," Kuykendall said.

"But we wanted to develop the program ourselves and run it internally on a test basis. The program we developed with the use of Cogen is now being used by two of the bureaus," he continued.

More recently, the department used the generator to write an application for Henco's research and development section that analyzed a sampling of the same brochures to draw some conclusions about sales. Among the items generated were tallies of how many customers bought one item, two items or more. A similar breakdown listed the number of purchasers making a purchase of a specific size.

"Here again, we used the generator to produce a series of modules that were merged together into a single skeletal source file," Kuykendall explained. "We then added code as necessary."

### Experimenting With Micros

Henco is now experimenting with microcomputers to share the processing load in-house, with the microcomputer version of Cogen used to generate programs. The department is already using its Radio Shack TRS-80 Model II to emulate a terminal on the mainframe.

File transfers will be the next step, using a communications program also being developed in-house.

Ultimately, Henco intends to use the micros in such applications as special order processing, fuel tax computation and some parts of inventory control and sales information.

By distributing the processing with microcomputers in the user departments, the company hopes to forestall yet another NCR upgrade.

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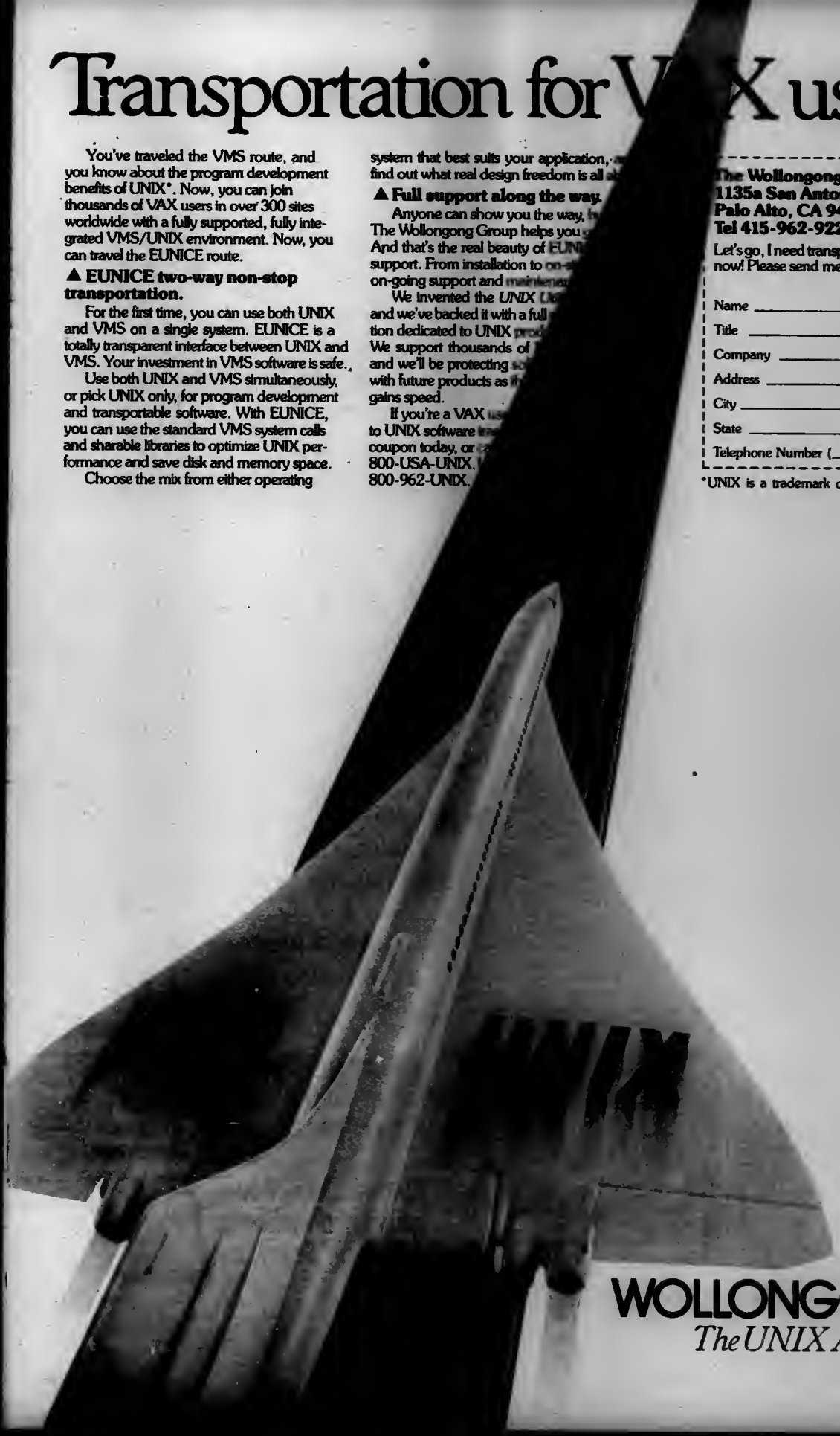


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# Bank Designs Own Applications With Package

TRUMBULL, Conn. — Question: When is a software productivity package not called a software productivity package?

Answer: When it was developed in the early 1970s before programmer productivity enhancement became part of the computer industry's litany.

That's the case with Banktran, a user-customizable transaction software package introduced in 1974 by Bunker Ramo Information Systems for use with its then-new on-line Bank Control System (BSC)-90 branch and administrative terminal system for commercial banks.

One of the first software packages developed specifically as an aid to users in designing and implementing their own applications, Banktran is a modular, table-driven system that offers banks extensive flexibility in development of the parameter tables, screen masks and other system elements that determine how tellers and other bank branch personnel utilize their CRTs to make inquiries into customer account files, process transactions, enter new account data and perform other on-line banking functions.

The system also allows each bank to determine how transaction data is to be stored, summarized, transmitted to a host computer and utilized for teller and branch balancing at the end of each day.

### Original Purpose

Banktran was originally developed simply as a means of facilitating the conversion of banks from manual transaction processing and phone balance inquiry systems to on-line operation utilizing CRTs, local minicomputers and dedicated phone lines to a host computer system.

However, Banktran is now also being used extensively by banks throughout the U.S. and Europe in the rapid implementation of new products and services required to compete effectively in the changing financial industry.

Bunker Ramo estimates that use of Banktran can reduce the time and cost associated with on-line conversion or new on-line product development by as much as 50%. In order to help banks realize those software development savings, the company offers two weeks of intensive training

*(Continued on SR/52)*

# Tool Helps Firm Speed Analysis

*(Continued from SR/47)*

which did occur," he added.

The other reports that DCD II produces are called program-level reports. The source list report is the one that Fafnir uses extensively. It creates a usage narrative for each field in working storage and a reference back to each data field as it is used in the procedure division.

In addition, all entries into and exits from paragraphs in the procedure division are documented. All of this information appears where it is of the most use, on the compile listing directly to the right of the item being described, and not at the end where it is difficult to use.

"The source list report has proven so useful," Rappaport said, "that it is included on every compile done in the department. In fact, the source list report is the program listing we keep in our library for the production program document.

"The cross-reference on each page of the compile listing is so easily and effectively used that it is hard to remember how an old-style cross-reference at the end of the listing was used for debugging," Rappaport said.

Fafnir has been using structured program design techniques since 1978.

Structured design, with its use of performs, and the program-level cross-references go together to produce a compile listing that completely documents the program flow in a concise and easily readable form.

The time savings afforded by the ongoing use of DCD II became even more important as the programming staff personnel changed. Programmers were often working in programs that they had not worked on before, and when analyzing the program logic, the procedure division correlations in the program-level cross-reference enabled them to follow that logic much faster.

"When trying to understand a program, losing your place in a listing means losing your train of thought," a programmer/analyst at Fafnir offered.

"By having a thorough cross-reference beside the compile listing, there is a lot less flipping back and forth.

"And that means less time trying to keep track of where I am and more time available for actually analyzing the program," he explained.

The Elk, an Elkhart, Ind., landmark, stands guard outside city municipal building while programmers work inside.

# Preprocessor Helps Firm Win City Software Contract

NEW PARIS, Ind. — Give a man a productivity tool he can sink his teeth into, and pretty soon he's competing with larger, established firms to win substantial software contracts. At least that's what happened to Jim Kaufmann, president of Kaufmann Software here.

Kaufmann is one of more than 40 users of the RPG-II½ Source Preprocessor, a programming productivity aid for the IBM System/34. Developed by BPS Information Services, Inc. of Conrad, Iowa, RPG-II½ gave Kaufmann the capability of coding programs in a subset of RPG-III, a version of the language previously unavailable to System/34 users.

When the city of Elkhart, Ind., announced its decision to automate its financial accounting procedures in mid-1982, Kaufmann had been using RPG-II½ for about six months. As a result of the language enhancements he was able to use — new structured programming commands, externally defined disk and workstation files and enhanced procedural file processing operations — Kaufmann believed he had a competitive edge and bid on the municipal contract.

"I knew they were going to be doing something back in May of last year," Kaufmann recalled, "so I had been working on a payroll and general ledger system that I thought would meet their needs . . . I got 50 pages of bid specifications on what they wanted in their software on June 8.

"By July 13, a bid had to be submitted, checking off what things the existing package currently could do, what things it could be modified to do and what things you could not get it to do. It had to be an existing package by the time I turned in the bid — and it was. However, I continued to work on the modifications now that I had the bid specifications in front of me."

Kaufmann underbid the competition, a larger East Coast software house, by $15,000; yet his system was evaluated by the city as providing greater functions. In addition, because it was written in RPG-II½, the system was upward-compatible with System/38 RPG-III and would not require costly conversion in the event of a hardware upgrade. He was awarded the contract on Sept. 21, 1982.

Within one week of signing the contract, Kaufmann's system was writing purchase orders. By Oct. 1, the city was writing accounts payable checks. By January 1982 — nine months from the initial design of the system — the general ledger, accounts payable, purchase order, payroll, budgetary, fixed assets and cash flow projection applications were all in place and running live.

The final system was processing

(Continued on SR/54)

Deputy controller Marybeth Hicks and Jim Kaufmann discuss program modifications.

# Package Aids Bank's In-House Programming

*(Continued from SR/50).*

at its headquarters here on the use of Banktran and its associated system software.

Although most banks are reluctant to discuss their internal operations, at least two banks that have installed the BCS-90 system and its Banktran package confirm the system's effectiveness in applications software development.

Richard Giebelhausen, vice-president of Herget National Bank of Pekin, Ill., reported that one programmer at his bank, after attending the Bunker Ramo training school, designed the 75 screens and wrote the 20 Cobol programs required to convert his bank from manual to on-line branch operation in only 60 days using Banktran.

Bank of America, the nation's largest bank, is currently utilizing Banktran and its associated BCS-90 terminal and branch minicomputer system in two test branches to develop what it calls its "branch of tomorrow."

In explaining his bank's choice of the Bunker Ramo system for these pilot branches, Al Rios, Bank of America's assistant vice-president of branch research and planning, said, "We researched the on-line software/hardware offers of other system vendors, but at the time our decision was made, the only readily available software that had a record of proven performance, as well as the flexibility to be modified to meet our specific needs, was Banktran."

As a software generation tool, Banktran provides users with modularized, nonspecific applications software for the generalized on-line handling of transactions, inquiries and other functions at their branches, as well as software that organizes that data for transmission to the bank's host computer system for further processing in batch mode.

In implementing Banktran, each bank first reviews its current manual transaction handling processes and develops a set of specifications for each transaction handled by tellers and other branch personnel utilizing an on-line, CRT-oriented system.

Utilizing Banktran, a bank's programmer then simply employs byte arrays to fill in parameter tables that define to the system all the variables, such as transaction processing sequences, display formats, journal data, validation data and host routing procedures related to each transaction or application.

Typical parameter tables include a keyboard translation table that translates the hardware codes produced by teller keystrokes to internal system equivalents, a mask table that contains one-word entries representing each screen mask's address and a transaction processing table that determines the validation format, number of validation documents required, teller authorizaton level, routing, cash in/out totals control, disk totals control, net total control, account number validation, dollar field comparison and other field checking after the teller presses the transmit key.

A second level of customization is also possible by the creation of exits from the Banktran software to allow insertion of specialized user routines with a straightforward interface to the system control software.

Since the entire BCS-90 system is program-controlled, a final level of customization allows a bank to replace entire Banktran modules with its own routines, if desired. However, such extensive modifications tend to negate the basic aim and function of the Banktran package as a software development productivity aid.

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# Software Packages Streamline Dairy Production

BOSTON — A dairy firm here has been able to reduce its DP operations staff while at the same time boosting its productivity by installing two software utilities.

According to Thomas O'Donnell, manager of corporate operations at H.P. Hood & Co., Hood has made dramatic productivity gains over the past three years because of the installation of CA-Scheduler and the Tape Library Management System (CA-TLMS-II) from Computer Associates International, Inc.

Hood has been able to cut its DP operations staff from 35 to 22, but O'Donnell stressed that the cuts in staff resulted through attrition, not through layoffs.

Hood is a diversified dairy products company headquartered in Boston. The company includes a New England Dairy Division, also based in Boston, a nationwide Citrus Division, based in Dundeen, Fla., and a Cheese Division, which distributes private-label cheese products throughout the country.

O'Donnell said his department runs a diverse group of computer systems. The main data center in Boston uses an IBM 4341 Model Group II, an IBM 3031 and a Hewlett-Packard Co. HP 3000 processor. in addi-

*(Continued on SR/56)*

# Preprocessor Helps Firm Win Contract

*(Continued from SR/51)*

between 60 and 100 types of transactions involving 60 externally defined disk files, about 200 programs — 40 of which were interactive data entry or inquiry routines — and approximately 16,000 lines of code.

As required by the city, the accounting package also conformed to the generally accepted accounting principles established by the American Institute of Certified Public Accountants and applied the Governmental Accounting and Financial Reporting standards developed by the Municipal Finance Officers Association (MFOA).

"The [MFOA] certificate is the highest award a municipality's corporate finance can be granted," explained Glorya Hornell, controller for the city of Elkhart. "In order for a city to obtain and maintain a good bond rating, there are many factors which enter into it; but one of them most definitely is the type of financial reporting and an MFOA certificate." A city's bond rating results are the interest rate at which it can borrow money.

Month-end closing, a two- to three-week affair under the old manual system, could now be accomplished in a couple of hours. Cash flow projections that once took weeks to compute were now available in five minutes.

"[Kaufmann] accomplished everything in a most professional fashion," Hornell declared. "Not only do we have the kinds of reporting we want, not only are we getting good cash flow projections, but we're getting good accounts of our investments, our licensing and all the many, many types of city business that go through the finance department here."

The city's accounting firm, which was heavily involved in both the system specification and bid evaluation stages of the software acquisition, concurred. "Based upon our final review of the installed system's ability to meet the defined requirements," said Donald R. DeGroff, senior partner with Proe, Chizek and Co., "Kaufmann has provided the city of Elkhart with a very comprehensive governmental accounting system."

Kaufmann believes it could not have been done without RPG-II½. "Just to give you an idea, the payroll data entry program was only two pages in RPG-II½, but it generated in excess of 700 to 800 lines of RPG-II code," Kaufmann said.

External screen definitions could be modified so easily that Kaufmann once walked a city employee with no programming background through a screen format change over the telephone. And because all disk files were externally defined, "We never worked with test files. Never. I made modifications to live data files, putting extra fields in, increasing the size of fields. In RPG-II½, all you do is change the external file definition and recompile your programs."

Kaufmann added that an RPG-II½ utility tracks which programs need to be recompiled.

Kaufmann also noted that it was extremely helpful to have structured code when making modifications. "Programs become much more self-documenting," he said. "You don't have to ask, 'What does indicator 24 do?' You say, 'If it's less than this, do these things.' That in itself allowed me to go back to a program I hadn't looked at in three or four months, understand what the program was doing and know exactly where I wanted to make the change.

"You can't write a good financial package in nine months," Kaufmann concluded.

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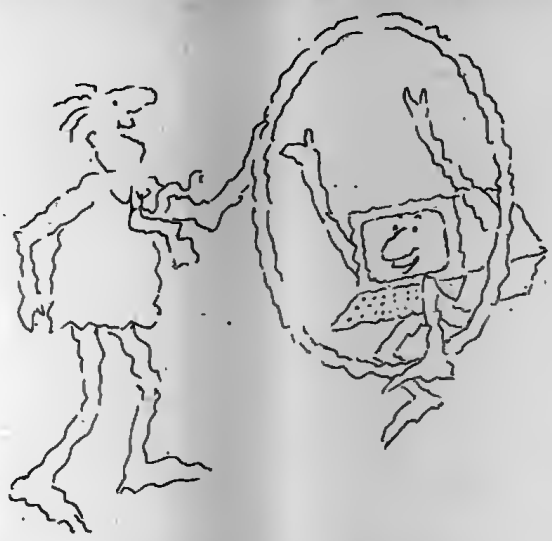

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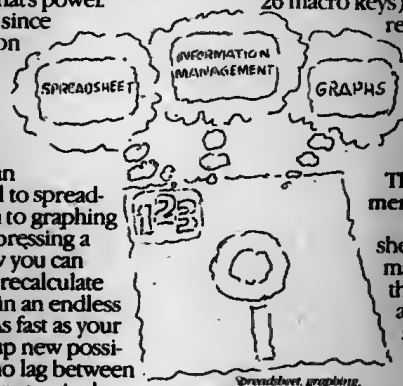


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# Prototyping Tools Get System Up on Time

BOULDER, Colo. — The Environmental Research Laboratories (ERL) of the National Oceanic and Atmospheric Administration, a little more than a year ago, faced two major problems:

- A directive from the General Accounting Office (GAO) to restructure completely its Property Accountability System for better reporting and control of the multimillion-dollar inventory of 50,000 supply and equipment items deployed worldwide.
- Instructions to get the job done in 18 months.

William Takasaki was faced with this monumental task on almost the same day he assumed duties as chief of ERL's supply services at the headquarters facility here.

Robert Wang, chief of computer services for ERL, viewed the directive as an opportunity to focus on overall improvement of the laboratories' information systems and to take advantage of the recently installed Control Data Corp. Cyber 170 Model 750 computer system.

The most immediate problems were where to begin and how to develop a program that could track the procurement, location, transfer, maintenance, condition and replacement of equipment ranging from oscilloscopes and chart recorders to boats and airplanes equipped with scientific instruments.

About the time of the GAO audit, Wang had attended a seminar conducted by CDC that inciuded men-

*(Continued on SR/58)*

# Dairy Firm Streamlines Production With Packages

*(Continued from SR/54)*

tion, the firm is currently installing a variety of microcomputers, including micros manufactured by Apple Computer, Inc. and IBM.

Another system housed in the Boston DP center is a Digital Equipment Corp. security system, which handles plant security as well as computer security. Hood also runs a DEC inventory control system at its main ice cream production plant in Connecticut, O'Donnell said.

The CA-Scheduler package is being used to control production work loads. The CA-TLMS II package is being used to control and protect tape data sets, he explained.

By properly integrating and scheduling jobs, O'Donnell said that Hood has managed to cut its daily work schedule by several hours. This is because CA-Scheduler has eliminated out-of-sequence jobs and helped to reduce reruns by more than 50%.

"The reduction in reruns is a conservative estimate," O'Donnell said. "I have been able to state to senior management that we have not had a job run out of sequence in nine months. It's nice to reach that status, and we could not operate any other way."

By improving production control, Hood has been able to increase service, turnaround time and response time to users. In addition, it has allowed operators to spend less time solving detailed problems and more time becoming better managers of resources, O'Donnell stated.

CA-Scheduler has enabled Hood to make better use of personnel by allowing the firm to relocate a number of employees who were needed to control production flow.

"CA-Scheduler may be only part of the reason for this, but it's a major part. In fact, it's the backbone of our improvements," O'Donnell said.

*In-House DSS Replaces Service Bureau*

# Batch to On-Line Transition Eased by IFPS

CHICAGO — A utility company here that was converting its DP operation from a predominantly batch-oriented shop to an on-line interactive installation was able to ease the transition with the use of a decision support system.

Natural Gas Pipeline Co. of America is the fourth largest natural gas transmission company in the U.S. It is a subsidiary of Midcon Corp.

As the corporation's users became more involved in development efforts, the Management Information Systems Division of Natural began providing research, shared data bases and software tools to support those efforts. "Investigating a decision support system package for use in-house was part of that support," Planning Manager Arthur H. Chapman explained.

"A financial modeling package had been provided to our users by a service bureau. It was expensive to operate, and demand for its use was rising. One of the users asked the Management Information Systems group to look at the feasibility of installing a decision support package, known as IFPS (Interactive Financial Planning System from Execucom Systems Corp. of Chicago), in-house on Natural's computers. The desire on the part of management to expand the availability of interactive tools for users had been formalized at approximately the same time," he said.

The firm acquired a copy of the decision support package from Execucom and tested it on its Wang Laboratories, Inc. computer, utilizing financial modeling data previously run by a corporate partner of Natural's in a joint development project. The firm also looked at a competing package and ran the same tests on it. "The search was not only to find the right package for a particular user need, but one that would fit well into a group of interactive user tools to be acquired over the next few years," Chapman said.

"IFPS turned out to be the most balanced package for Natural and indicated significant savings over the service bureau approach," he added. This package was then acquired and installed after a period of contract negotiation.

Three users from three departments originally expressed an interest in financial modeling using this service. In the seven months since its installation, an additional 50 people in 10 departments have been trained. Analysis of the use of the service bureau for similar functions showed a drop of 85% in charges for this type of activity, according to Chapman.

He felt that the successful package installation included particular emphasis on several areas. The first involved a full-test to make sure the package would perform as specified. "We try to use data that closely approximates actual ultimate usage by our company during these tests. Where possible, we also try to test the packages out on our equipment," he said.

The firm requested the vendor to set up the package and test it. This reduced the effort on the part of our personnel and allowed for initial measurement of the professionalism and commitment of the vendor at a local level, according to Chapman.

"This commitment of the vendor at both levels is espe-

*(Continued on SR/60)*

# Model Helps Complete Job on Tight Schedule

*(Continued from SR156)*

tion of a new method for building information systems. Called information analysis, the methodology included a process for in-depth analysis of user needs and understanding among all parties involved in a description of the problem and definition of what the data base information means.

After preliminary discussions with CDC's Professional Services personnel, ERL's supply and computer services management decided that information analysis promised the most efficient way to determine what information was needed and how to structure it for meaningful reports.

A project team was formed and enrolled in CDC'a seminar that taught the fundamentals of information analysis, how to analyze and define information and how to develop information requirements in user-oriented natural language sentences.

"Forty-five days after work began on the project, we had a model of the system operating on the Cyber 750," Wang recalled. "The data model is one of the major features of information analysis that was used extensively for developing data bases.

"With the data model, we can get a view of exactly what the system will produce and are informed about missing, redundant and inconsistent data," he added.

Users of the Property Accountability System were given a system demonstration that produced exactly what reports they would receive and in what format.

With traditional data base building methods, such user reports are not available until near project completion, when 90% of development resources have been depleted. At that point, major changes are costly, time-consuming and most often "patched in," which reduces efficiency and economy of operation.

The data model was accomplished with CDC'a Information Management Facility (IMF), which is applicable to either data modeling or a production environment.

Among its capabilities is the automatic generation of internal structures needed to support the way data is to be stored and interrelated. Physical storage of data can be restructured at any time without changing the application software.

The prototype phase revealed that some areas of supply services needed more categories of information, while others could be reduced. Some areas had data in machine-readable format; others did not. This information allowed for early scheduling of tasks to collect and convert data.

Revisions to the analysis during prototyping resulted in the creation of eight records that ERL personnel could access in tracing a property item: identification, acquisition, inventory, transfer within the organization, storage, property excess, property loans and property deletion.

According to Wallace Hamilton, team leader for the project and one of CDC's experts on information analysis, only six weeks of work was required to develop the data model that generated the 31 reports required by the GAO directive.

These were created from 100 elements of live data taken from existing information. Less than four hours was required to develop the data entry program for the 11,000 records loaded into the data base.

"For a minimum investment, we learned the system would work, and the users were satisfied with the prototype results," Hamilton reported. "With any traditional approach to data base development, six weeks of effort would have produced no measurable results."

Having obtained the results through prototyping, ERL chose to install IMF and Query Update on the Cyber Model 750 for production of the data base to handle the Property Accountability System. CDC'a Query Update is a program that interfaces with IMF to provide interactive or batch-mode query, update and report production.

Within eight months, ERL had analyzed, modeled and implemented a system that not only met the needs of Supply Services, but created individual user confidence and positive comments.

This response encouraged Wang to promote automated information services to other areas such as telephone usage, the library and security. Data from each of these areas will eventually be interrelated to serve the users better.

For example, the facility telephone directory is stored directly on a computer disk for easy update from a terminal. The library is in the process of preparing its books, periodicals and other reference materials for disk storage and update from terminals.

In the future, ERL personnel will be able to order library resources by terminal.

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CW 6/27

# *Utility Saves Programmers From Drain of New Project*

MADISON HEIGHTS, Mich. — When a company introduced plans to implement a Business Resource Planning (BRP) project, the manager of systems and programming found himself headed toward a data processing dilemma: too few people, too much work and a growing backlog.

The BRP project was designed to automate and link together about 20 DME Co. locations, from order entry through shop-floor control to costing and purchasing. The project, combined with a growing increase in the data processing work load, threatened to delay DME's response to their users.

DME, a division of VSI Corp., which is a wholly-owned subsidiary of Fairchild Industries, Inc., is a leading manufacturer and supplier of standard and specialized mold bases, mold components and

*(Continued on SR/62)*

# Transition to On-Line Eased By Decision Support System

*(Continued from SR/57)*

cially important in the case of packages like those in the area of decision support. Since this is a constantly evolving function, new versions of the package can be anticipated. Guarantee of continued support to develop and install these enhancements becomes significant," Chapman said.

Chapman felt that a major change in contract negotiation is just beginning to appear for packages utilized on computers involved in on-line interactive networks. Many packages are sold for use with the price related to installation on a particular central processor. "However, the new networks allow a user to address any one of a number of central processors from a terminal attached to any location in the network. Pricing policies need to be worked out with software vendors to take this multiprocessor participation into account. Corporate, network or site pricing may have to be considered," he suggested.

Another feature of the contract that needs special negotiation concerns local support, he continued. Where the package is installed on more than one central processor in more than one city or more than one metropolitan location, arrangements need to be made to support each installation. Where the sales person received a commission and has jurisdiction over one of the locations, the other location may not get good support.

One contract feature that should be watched carefully, he said, is the condition for release of unauthorized package information by employees. "Some contracts have carried clauses that leave the customer open to a potential liability of all the marketing damages in a particular part of the country. The package could cost $40,000, but the liability for market area damage could be hundreds of thousands of dollars," he cautioned.

Maintenance is another aspect of contract negotiation that has been receiving new emphasis. This includes changes to the current software to fix errors and upgrades. "While normally involving new functions, upgrades can also include changes in operating systems. As operating systems change, features that may have taken advantage of specific hardware characteristics may no longer be available, and further software changes may be needed," Chapman said.

He advised that the contract should specify training, lease or purchase features, state of ownership, maintenance provisions, installation support and charges, local support (trouble shooting), provision for upgrades, security, disaster/recovery, state of deliverability of the package, delivery of source code (or appropriate lock box arrangements) and a tax implication, including investment tax credit. Finally, a legal staff with backgrounds in data processing contract negotiations is very helpful.

"Actual installation is pretty straightforward for most vendors. It is the training in a distributed processing environment that becomes a challenge," Chapman said. "If many people need to be trained, or questions continue on how to use the package effectively, a coordinator may need to be assigned to this activity. Secondly, the best training for on-line interactive packages is one person to a terminal and half-day sessions. This will lengthen the number of training sessions and the time to train, but the results of this hands-on education is quite good."

# Disk Space Crunch Relieved With Data Compression Tool

BURLINGAME, Calif. — When SP Communications, Inc., provider of Sprint long-distance telephone service, was faced with a mounting computer disk space challenge last fall, the company turned to a data compression system with the hope of finding a low-cost solution to its costly disk storage requirements.

"The system has been a great success," Bill Phal, director of DP, said. "We are a large IMS shop, and we have some big data bases. Like every other shop, we were getting a little tight on space, and disk space is a big concern to us." The product chosen was Com-Pres from Database Technology Corp. in Chicago.

"We originally chose Com-Pres because the price was right. The company that offers the product was just getting into the data compression market, it had a good product at a reasonable price and we were willing to take a chance on it," he said.

The data processing operation at SP Communications is an IBM IMS shop with storage capacity in excess of 100 spindles of direct access storage device (Dasd). The shop uses all IBM equipment and has installed Com-Pres on its main production machine, an IBM 3033N.

SP Communications installed Com-Pres four months ago. Phal estimated that his department has achieved 40% to 45% data compression with the system. He said he is particularly pleased with the compression level when it is measured against the cost of the product.

"I don't know what rate of compression we might have achieved with one of the higher priced products, but I can't believe that paying a tremendous amount more would have gained us much more than what we got with Com-Pres. And even for 10% more compression, a package costing seven times as much would not have been worth it."

He said the low cost of Com-Pres made it easy to justify purchasing the product. "If I had wanted to spend $49,000 on a data compression system, I would have had to go through a major justification process. Compared with the price of competing products, the cost of Com-Pres was a drop in the bucket, and yet it works beautifully."

Because of the massive and growing amount of data being stored at SP Communications and the obvious need for a data compression routine, the company's return-on-investment time for Com-Pres was not considered to be of primary importance in the decision to purchase the product.

"Dasd is an expensive medium, and you never seem to have enough of it," Phal said. "Data bases are notorious for eating up Dasd, and like every other company, our user community wants more and more data on-line for each access.

"It just makes sense to use compression routines that can pack more data onto each spindle."

SP Communications is using the Com-Pres system on its master files related to billing, order-taking and accounts receivable. Because of the vital nature of the data, the system's reliability was of major importance to Phal.

"These are the main data bases that drive our company, so we were dealing with a very valuable resource," he said. To assure that the product would perform as promised with no loss of data, it was first tested on several of the company's read-only data bases.

"These data bases are totally refreshed at night and are read-only

*(Continued on SR/64)*

**Doug Boven, computer operator at SP Communications, Inc.**


Terry Socall, manager of systems and programming; Greg Weddle, a systems analyst; and Linda Beaumont, estimator, at DME headquarters.

# Utility Saves Programmers From Drain of New Project

*(Continued from SR/60)*

associated products for the plastic injection molding and die casting industries. The systems and programming department controls all the data processing functions for all DME locations. It supports the standard DP functions, along with sales analysis, product analysis and marketing analysis.

The work involved with the BRP project added heavily to the existing work load, said Terry Socall, manager of systems and programming. This drain on his programmers' time stimulated Socall to form a project team designed to explore methods to keep his programming staff from becoming involved in routine report requests.

The team, which consisted of data processing professionals and end users, evaluated various software systems designed to save programming resources. A final evaluation called for the implementation of a system that would allow end users to perform their own requests and reports.

Since 75% of DME's accessed data resides on IBM DL/I data bases, an overriding concern was to find a software system that provided complete interface with DL/I, and offered extensive training, Socall noted.

In their search for an information analysis and retrieval system, DME installed two major software systems. Ironically, both of them failed to meet the project team's requirements.

### User-Oriented Means

However, TSI International's Data Analyzer was able to satisfy the team's requirements. The Analyzer, which was installed at DME, offered user-oriented means of accessing data without end users having to learn DL/I concepts and codes or constantly be dependent on programmers to write data base access statements, Socall said. Through the analyzer's extended interface, users have complete DL/1 access flexibility.

Within a few hours of training, end users were producing simple reports. After a couple of days, they were creating very sophisticated requests and reports, the manager noted.

The bottom line resulted in more independent end users who no longer had to rely on the systems and programming department to run all their reports or to code every request.

Free of this responsibility, the DP staff was able to direct more of their attention to the BRP project. Socall also credited the Analyzer with tying in the other DME operations to the computer and to information that was previously unavailable.



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# Firm Looks Inside for Productivity Solution

VIRGINIA BEACH, Va. — Metro Information Services, Inc., a professional services and software products development firm headquartered here, had a requirement in 1982 to develop two major systems for clients.

One client was a major advertising and public relations firm; the other client was Metro itself. The advertising agency required a system to support its general business operations and the agency-specific tasks such as job tracking and media analysis. Metro owned a proprietary package for residential construction firms and wanted to make significant design enhancements.

The design enhancements to the construction system had solidified during several years of use in several client sites. A short implementation period for a new release of the software was desirable since space and terminal availability for development were in short supply, and client demand was high. As with any project, costs were to be kept at a minimum.

In the case of the advertising system, Metro had progressed through the initial phases of the Metro systems implementation methodology and had presented to its client an analysis and requirements report, describing the functional requirements of the advertising business, and a functional systems design document. Again, items of primary consideration were cost and implementation schedule.

Programming estimates for enhancements to the construction system and development of the advertising agency system were in the 8,000 man-hour range, a number that could not be easily absorbed by the existing staff. This forced serious consideration of a productivity package.

A special project team was assem-

*(Continued on SR/66)*

# Data Compression Eases Disk Space Woes

*(Continued from SR/61)*

for the on-line environment, so we felt no reluctance in testing the system on them.

"When we loaded up our read-only files, we experienced no performance problems of any kind, and we achieved space savings in the 40% to 45% bracket," Phal pointed out.

Doug Boven (left) and Larry Rebarchik, computer operators at SP Communications, Inc.

The company has since converted all of its on-line data bases to the Com-Pres system with no complications and with comparable compression rates, Phal said.

He said the Com-Pres package was installed quickly with no problems, and the data was easily converted during a scheduled monthly reorganization.

Installing Com-Pres is a one-step operation. The system is supplied in object code form, ready to be link edited into a program library. Data base conversion consists of three steps: unloading the data base using an IBM-supplied unload utility, adding Com-Press to the Data Base Descriptor and reloading.

"Support is the name of the game with these kinds of products, and we've had a good rapport with the company," Phal said.

"When we were installing the product, we were very concerned that we did everything right so that we wouldn't have any problems."

*Choosing Right Tool for Right Reason*

# ADF Can Lead to Improved DP Productivity

By W.W.D. Dowdell
Special to CW‡

Constantly rising DP salaries, decreasing hardware costs and the ever-increasing user demand for automated systems have made packaged productivity tools some of the best-selling items on the market. Most DP managers accept the fact that tools can improve productivity — but how do you select the right tools for the right reasons?

The concept of the Application Development Facility (ADF) is a potential path to productivity. The ADF can be viewed as the framework of procedures, controls, techniques, standards and software tools necessary to implement and enforce an efficient applications development and maintenance methodology (see Figure 1).

The following are some suggestions regarding the successful use of ADF to improve DP productivity:

- Choose your methodology first. Productivity tools must support a sound development methodology, rather than vice versa. Frequently, individual productivity aids are selected to support specific elements of the applications development and maintenance cycles without regard to their effects upon the entire process. For example, if a tool encourages poor applications or data design techniques, productivity over the life of a system can be seriously impaired.
- Choose your methodology wisely. A sound applications development and maintenance methodology is required to measure and im-

*(Continued on SR/68)*

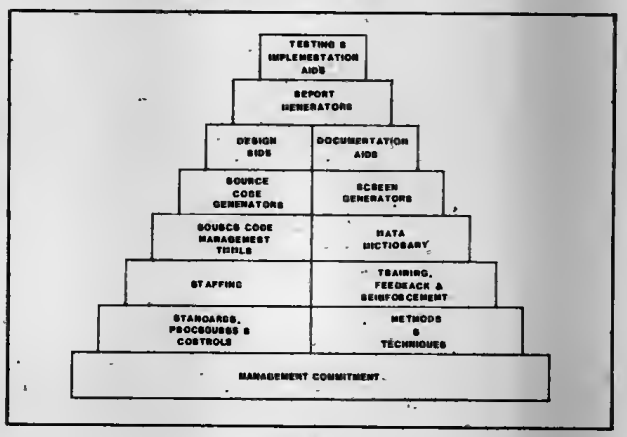



Figure 1

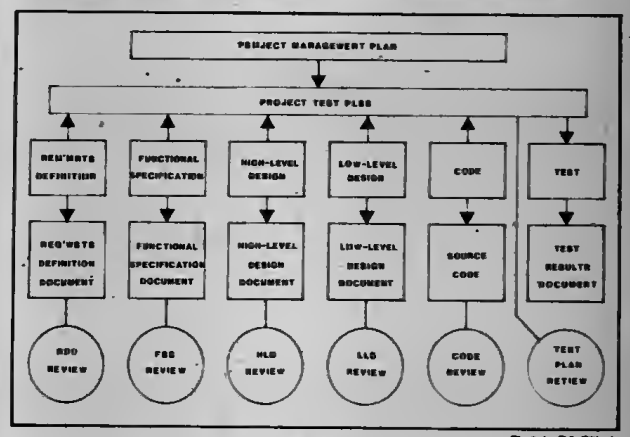



Figure 2

Charts by C.A. O'Keefe

# Productivity Answer in Firm's Own Backyard

(Continued from SR/64)

bled to define the requirements of a productivity package that would allow rapid development and provide the features Metro required:

- The reusable code technique was preferred over code generation. Code in the operational system was to be reduced 50% to 80% to minimize maintenance costs.
- The developed systems needed to be portable from one manufacturer's hardware to another without major changes.
- Modules were necessary to handle stringent security administration, menu generation/maintenance, file maintenance and report generation.
- All programming was to be done in ANS Cobol to allow any of Metro's 60-member technical staff to participate in product development or maintenance without special language/procedure training requirements.
- The productivity package license would be priced at under $20,000 or, preferably, be available on an annual license basis.

The search for a productivity package that met all or most of the requirements was unsuccessful. Faced with either doing things the old way or making major concessions with a known productivity package, Metro elected to create a package.

Design and development of the productivity package was done in a priority mode and was accomplished by a team of Metro's senior staff. This team was comprised of individuals with extensive backgrounds in varied hardware; the minimum experience level was seven years.

### Security Module

The first part of the productivity package to be developed was a security module. The project team found that existing hardware systems either required a technical analyst to design a security scheme or they provided little or no security. The project team designed a security module that allows the user to define security access rights without regard to technical considerations.

To accomplish this, the security module was designed to accommodate up to 999 security classes. Each security class is assigned a specific set of rights to inquire, add, change and delete functions at the data file level. In addition, each user class is assigned execution rights to each program in the system. One user is designated as the security administrator responsible for assigning each other user a security class. This provides a simple and effective means of controlling every function in an application system.

Next, a menu module was designed to create and maintain menus. The menu module also interfaces with the security module. This module displays application menus to the user and allows the user to select a specific program or function to be run. In addition, each request is verified against the user's security class to determine if the user has access rights to the selected program or function.

A file driver routine was created to access all files in the system. This allows a programmer to access data from any file within the system without regard to Cobol file driver sections.

A screen driver routine was designed to control all screen development. This allows the programmer to design and control screen handling without regard to specific hardware considerations such as setting screen field attributes.

A file maintenance module was provided to allow a programmer to develop file maintenance programs. The file maintenance module accommodates any number of on-line files, scrolling, multiple data screens and data verification. The file maintenance module is also linked to the security module.

A report generator module was designed to provide the power of a report generator with all the flexibility of a standard Cobol program. The module controls sorting and selection of records, background/foreground processing and report control break sequences. Some of the runtime options provided to the user include screen display and/or printed output and user-defined header lines that may be printed for each report.

The productivity package was implemented on a Wang Laboratories, Inc. Wang VS system at Metro headquarters, and the development of the application software for the advertising agency and residential construction began immediately.

The gains in productivity realized were very much in line with expectations and as a result, organization of the development teams changed dramatically. The development effort estimated to take 8,000 hours using conventional programming methods was completed in 2,000 hours using the productivity package.

*Major Overhaul Complete in One Year*

# System Speeds Redesign for Clothing Firm

HOUSTON — Original estimates called for three or four years to complete a major system overhaul, but a combination of new hardware and software helped the data processing staff of Walter Pye's retail clothing company here complete the project in just one year.

The firm used Prime Computer, Inc.'s Prime Information Series I-750, Prime's Info/Basic and SMS/Escape, a program generator from Software Management Systems of Englewood, Colo., to complete the project in a quarter of the time it would have taken with the company's NCR Corp. Criterion 8450.

Walter Pye's is composed of three corporations employing approximately 500 people. Two corporations are strictly retail merchandising businesses that include four men's and women's stores in Houston and one in Galveston. The other corporation manages the entire operation, including all data processing services.

"When we decided that we had to make a major system overhaul that necessitated rewriting most of the 799 programs running on our NCR, conservative estimates were that the job would take three or four years on the existing hardware and that to do it in that time period, we would have to add at least two more programmers to our staff," Ronald G. Waddell, director of data processing, explained.

*'When we decided that we had to make a major system overhaul that necessitated rewriting most of the 799 programs running on our NCR, conservative estimates were that the job would take three or four years on the existing hardware and that to do it in that time period, we would have to add at least two more programmers to our staff . . . [However, we] wanted to complete the job in only 1½ years.'*

Since Waddell wanted to complete the job in only 1½ years, it was necessary for him to find a quicker way. Some shopping convinced him that the powerful, user-friendly Prime I-750 and Prime's Info/Basic would enable him to make dramatic gains in productivity.

Upon installing the Prime system in April 1982, his next objective was to find a program generator that would complete the conversion as quickly as possible.

### Installs Generator

After looking over a half-dozen or so generators, he learned about SMS/Escape from a Prime Users Group just prior to the National Computer Conference (NCC) '82. He saw SMS/Escape exhibited again at NCC and decided that it was the generator that would significantly increase productivity. The package was installed in June, and the job has been right on target for Waddell's timetable.

"With Info/Basic and SMS/Escape, we will finish the job in 13 months, and that includes the time involved with learning the new system and new equipment. When we lost two members of our staff during the year, we didn't even have to replace them," Waddell said.

SMS/Escape is an integrated application development tool that is designed to work with the Prime Information minicomputers and that translates the user's English-language commands into Info/Basic code. Documentation is created and updated automatically when any change is made.

The Walter Pye's data processing staff now includes two programmers and four operators under Waddell's supervision. "The programmers have found SMS/Escape to be a wonderful tool for generating screens," Waddell continued.

"Each SMS/Escape sentence may generate 30 Info/Basic statements. SMS/Escape provides a user-friendly operating environment, and screens are generated almost automatically."

Since Walter Pye's wanted to complete the conversion as soon as possible, they have bought packaged programs whenever economically justifiable. However, Waddell pointed out, he has not found packages to meet Walter Pye's retailing needs.

Thus, the programmers have used SMS/Escape to develop a number of sophisticated applications to meet the company's operations needs. These include an interactive sales audit system and merchandising inventory system. There are 30 users from all departments.

An example of a data entry program that was developed with SMS/Escape is a program for keeping up with national credit card and cash customers. Until the development of this program, Walter Pye's could only keep track of its own credit cus-

*(Continued on SR/70)*



# Taking ADF Road to Improve Productivity

*(Continued from SR/65)*

prove productivity. The methodology selected should be based on principles rather than fads and should be reasonably compatible with the methods you already use (evolution instead of revolution). It must provide for disciplined development cycles; methods leading to higher quality and productivity; and techniques for planning, feedback and control (see Figure 2 on SR/65).

● Aim for cumulative productivity. The primary goal of productivity improvement should be to reduce the cumulative unit cost for software development and maintenance. The old phrase, "pay me now, or pay me later" applies here. Do not sacrifice sound design, documentation and maintainability for development productivity. It will end up costing more than you have saved to maintain the application through its life cycle. Every hour saved in future maintenance is an hour potentially available for future development.

● Change takes time. New methods increase learning curves, and some of the techniques that promote maintenance productivity can decrease apparent development productivity. Don't expect great leaps in productivity overnight. Remember that most DP shops spend much more time maintaining old systems than implementing new ones. With sound management, methods and tools, you should be able to increase cumulative productivity by a factor of two in three to four years and by a factor of five in six to eight years.

● Quality is free. One of the great misconceptions is that quality is expensive. It may cost time and money to provide quality, but it costs a lot less than poor quality. The further along errors go undetected, the more they cost to fix. Formal reviews at every step in the development process (see Figure 2 on SR/65) can catch most errors before they become too costly.

● Maintenance is development. Hardware deteriorates because of the lack of good maintenance; software deteriorates because of poor maintenance. Quality maintenance is critical to the life span of any software system and should follow all of the steps and controls applied to new system development. Software maintenance is merely new development with much of the work already done. Tools that do not enforce sound maintenance practices, or do not provide permanent audit trails for applied maintenance, can negatively affect cumulative productivity.

● Integrate data design with applications design. The design of logical data structures is at least as important as the remainder of the applications design process. Sound data design, coupled with modular applications design, is a major contributor to the life expectancy and maintainability of applications systems.

● Project management is a productivity tool. One of the least expensive ways to improve DP productivity is to minimize wasted time. Sound project planning and project management techniques go a long way toward eliminating wasted effort within the applications development and maintenance cycles.

● Management commitment is crucial. Because change takes time, the understanding and commitment of corporate management to the ADF philosophy is essential to any plan for improving cumulative DP productivity. There will be constant pressure on the DP organization to use "quick and dirty" solutions. Without management support to resist that pressure, cumulative productivity will decline as more and more cumbersome software accumulates.

● Don't forget training and feedback. Regardless of the technical sophistication of your methodology and tools, development and maintenance of software systems must still be executed by people. Those people must understand the methods and tools in order to use them productively. A considerable amount of time must be allocated to training, and individual adherence to standards and methods must be evaluated on an ongoing basis. Feedback from that evaluation process must be used to improve training and methods.

*Dowdell is the manager of development systems at Software International Corp., an Andover, Mass.-based vendor of financial applications packages.*



'I Couldn't Decide Whether to Lease or Purchase.'

*Runs as Transaction Under CICS*

# Firm Clears Bottleneck With Spreadsheet Tool

CHICAGO — With the advent of the microcomputer, the electronic spreadsheet has became one of the most powerful decision support tools used in business today. However, extensive use of microcomputers can backfire, as CFS Continental recently discovered.

CFS Continental is a full-time food distributor based in Chicago which surpassed the billion-dollar mark in sales last year. The company supplies food and nonfood products to restaurants, fast-food chains, airlines, hotels and hospitals.

Various components of the DP user community at CFS Continental are beginning to experiment with personal computers. Several business applications at CFS, such as budgets, performance analysis, time reports and forecasts, are well-suited to the electronic spreadsheet concept.

The spreadsheet capability has made the microprocessors very popular, and although the company maintains a large IBM CICS network, the IBM Personal Computer is in heavy demand in the financial department.

Joseph Cassis, director of financial systems at CFS, serves as a liaison between the DP department and certain key end-user groups. "The personal computer quickly became a bottleneck. In addition," he added, "we have 30 to 40 locations all over the country. Adding personal computers when we have remote terminals out there seemed like a duplication of resources."

George Koziol, manager of systems software, agreed. "Everyone is hot on the spreadsheets for the personal computer. When there is only one micro in a user department, it creates quite a lot of congestion."

### 'Seized the Opportunity'

To address the problem, CFS installed Omnicalc from Tower Systems, Inc. "If we could provide a good electronic spreadsheet facility through our CICS network, we could make it available to our users throughout the country without investing hundreds of thousands of dollars in micros and manpower resources. We had to seize the opportunity," Cassis said.

Koziol has been pleasantly surprised with the response to Omnicalc. "Omnicalc is steadily growing in use. People like it because they can get to it from any terminal, and it's very easy to use."

Omnicalc runs as a transaction under CICS. An Omnicalc user may define any size spreadsheet or matrix needed for a particular application,

Joseph Cassis

up to 255 rows or 255 columns.

In essence, the screen display at the terminal becomes a window on the spreadsheet. Using programmed function keys or scrolling commands, the window can be moved across, up or down, displaying any of the information on the worksheet. Omnicalc even supports multiplane matrices for a three-dimensional effect, Cassis said.

The interaction of a particular row and column on the worksheet is called a cell. A cell may contain alphabetic characters, such as a column heading, or numerical information, such as a line item in a budget. The user defines relationships between the various cells using simple commands.

Then, when the user updates the numeric contents of any cell, all related cells are updated immediately, Cassis said. With this capability, users can analyze the impact of any

*(Continued on SR/70)*

# Distributor Eliminates Bottleneck With Package

(Continued from SR/69)

number of alternatives or key business applications.

Cassis indicated a key CFS Continental application will be a budget process project. "Our staff here in Chicago can easily design the worksheets under Omnicalc," he said. "Then the users in each location around the country can call up the worksheets they need, enter their budget numbers for each period and manipulate them until they look right. Then we can immediately access the worksheets to print them off."

Koziol said the package also satisfies security requirements. "Omnicalc has full password protection and data encryption capabilities. This enables a user to store his or her worksheet and data in a secure manner."

According to Cassis, an even more important aspect of Omnicalc is a psychological one. "We've found many users to be somewhat apprehensive about using the computer. Quite simply, Omnicalc solves that. We see Omnicalc as a forerunner to a full-blown decision support system. "The system is so easy to use, you need virtually no data processing experience to design an applitation," he added.

"I had Judy Cleary, my staff assistant, design an excellent time-sheet application which we are now using in the department. She had never worked with a computer until we had acquired Omnicalc."

System response has been a surprise, Cassis said. "Of course, the personal computer is a bottleneck from an access standpoint, but the spreadsheet facility on the micro is also not as fast as Omnicalc," he maintained.

CFS Continental is considering the use of Omnicalc to replace many of the written forms now completed in the sales and distribution locations and mailed to the corporate facility in Chicago.

Both Cassis and Koziol expect the Omnicalc user base to continue growing. It should play an important part as the centralized data processing function is distributed out to the users, Cassis said.



# System Speeds Major Overhaul For Retail Firm

(Continued from SR/67)

tomers. Now, the company has the names and addresses of people who have purchased from them and who want to be on a mailing list.

Using SMS/Escape, a file was designed, creating a master list based on addresses of customers, and is updated with each purchase. The result is a qualified, targeted list that can be used for direct mail.

Waddell described a program developed to provide evaluations of items in their Christmas catalog. The purpose was to compare the buying patterns of people from 40 lists, noting which catalog items sold best from each group.

"In half an hour at the terminal, I had the program," he said. "In a Cobol-type environment, a similar program would have taken one to two weeks to define everything, check, test and debug."

### 'Savings Manyfold'

"With the new system, the savings to the organization is manyfold," he continued. "The productivity of the programmers is improved, the data processing responsiveness is much better and the costs of hardware and software have dramatically decreased.

"We would have to say that our satisfaction comes from a combination of the Information computer, Info/Basic and SMS/Escape. Information is exceedingly useful. Its ability to go in and generate a complicated report in half an hour or so is something that still amazes me,even though we do it every day," Waddell maintained.

He noted also that SMS/Escape's automatically generated documentation is especially helpful for interactive transactions. The screen displays the various entries, and hard copy is given to users.

Training for the Prime Information and SMS/Escape was provided by SMS through courses the company developed to teach new users how to use both the hardware and software. The staff took the first part of the course themselves and were trained by SMS in SMS/Escape.

Waddell points to the cost savings provided by the training course. "We more than make up for the course fee in the money saved by having the training program in-house. In addition to the tuition costs for a formal training session, the lost time and expense of sending people away for special instruction would represent a large amount of money."

*Replacing Cobol Programs*

# Fourth-Generation Language Ups Firm's Output

PARAMUS, N.J. — Can 10-year Cobol programming veterans find happiness and increased productivity with a fourth-generation language?

Yes, according to personnel at the Corporate Data Center of Becton Dickinson & Co. Increases in productivity topping 10 to one have been realized since the installation of Mathematica, Inc.'s Ramis II fourth-generation language and data base management system at the company headquarters in 1979.

A leading manufacturer of medical, diagnostic and industrial safety products for the health care field, Becton Dickinson now completes the development of most small to average-size applications in three to five days — a far cry from the average 15 to 30 days required to develop the same kind of applications using Cobol in the pre-Ramis II days, according to Data Center manager Dave Miller. Because of this, no new programs have been written in Cobol at Becton Dickinson since Ramis II arrived on the scene.

*'Using Ramis II, Becton Dickinson was able to develop an automated financial reporting system to track product sales for all divisions in only four months with one person working part-time on the application.'*

Using Ramis II, Becton Dickinson was able to develop an automated financial reporting system to track product sales for all divisions in only four months with one person working part-time on the application, Miller said. The project was started with Ramis II on a time-sharing basis while Becton Dickinson awaited the delivery of its first CPU, an IBM 370/158. The resulting application considers market share, market penetration, product life cycles, product age and source of sales.

Data Center project manager Len Sokol and programmer/analysts Joan Seidman and Sally Ann Sposato all use Ramis II for development of applications for their specific areas of concentration at Becton Dickinson. All three employees were experienced Cobol, RPG and/or assembler programmers prior to joining the company. Each received one week of training in the use of Ramis II prior to programming with it.

"Now, it takes about three Ramis II statements to produce the same result as approximately 100 lines of Cobol code," Seidman said.

Seidman, who concentrates on applications for the human resources section of Becton Dickinson, developed Ramis II requests for 90 monthly and 40 quarterly standard reports in addition to 14 quarterly reports required for Equal Employment Opportunity reporting over the last two years. Reports for the human resources section often require calculations on totals, text and report writing, all features enhanced with Ramis II, Seidman maintained. Most human resources department reports are done in batch using external files that were originally developed using Cobol.

*'Because request development is done on-line . . . errors are detected immediately and can be corrected as the program is developed.'*

Entire Cobol programs often are replaced with as few as 30 statements when using the fourth-generation language, Seidman said. As a result, over 15 old Cobol programs have been converted into Ramis II. Depending on the complexity of the program, she added, approximately 780 lines of Cobol code can be translated into a Ramis II request in one day.

"We also use REF, a Ramis II component which allows [extensive] access to non-Ramis II files because of our need to generate quick reports or sample sets from existing files," Sokol added. In one instance he was required to extract a test file of a few records from the International Sales Division's sequential forecasting master file, consisting of thousands of 2,193-byte production records. The user wanted to select particular records based on certain key-field or partial key-field values.

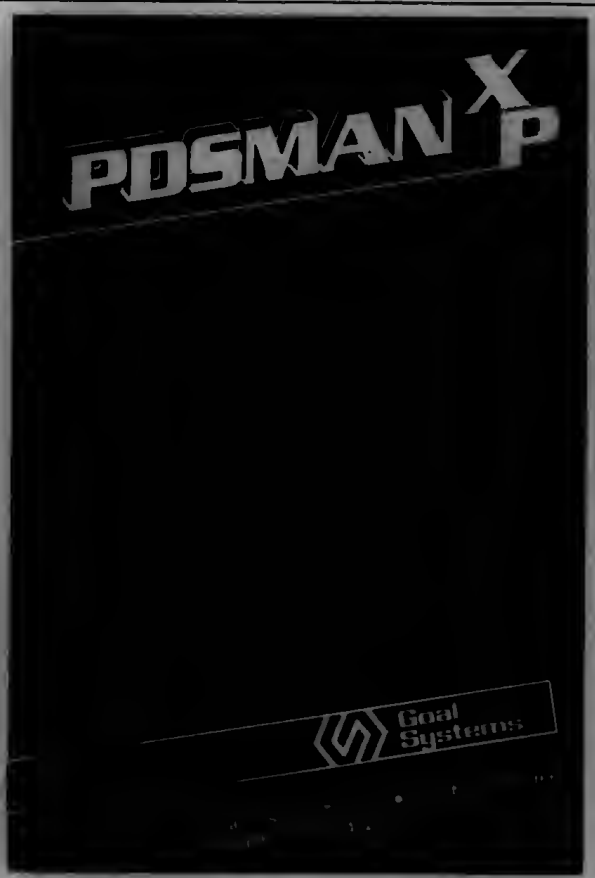
The entire process took less than a half hour, with the resulting completed program being a 15-line Ramis II request, Sokol said. The request enables the user to have complete control over the selection criteria, job submission and sample file creation for control-testing the batch production application.

"The reports needed from those samplings were produced that afternoon in only a few hours," Sokol said.

Because request development is done on-line with Ramis II, errors are detected immediately and can be corrected as the program is devel-

*(Continued on SR/72)*





# Fourth-Generation Tool Eases Coding Crunch

*(Continued from SR/71)*

oped, Seidman said, allowing some projects to be completed in two to three hours. There is no longer the need to follow the time-consuming procedures of coding, compiling, testing and debugging as with Cobol. Ramis II runs both on-line under IBM's VM/CMS and in batch under IBM's OS/VS1 at Becton Dickinson.

Documentation of new applications and programs is also easier and faster, according to Seidman. "Because Ramis II requests use English, getting users to understand definitions of key words for the desired results is no longer a difficult task."

*'A hidden benefit, according to Sokol, is the fact that costs for applications development are kept low and monies for the development of applications are kept within the company.'*

With Cobol, she said, "documentation had to take into account the operator as well as the end user. It was an additional strain on time to have to include information on I/O, operator intervention and storage."

A hidden benefit, according to Sokol, is the fact that costs for applications development are kept low and monies for the development of applications are kept within the company.

"When we quoted estimates on applications development using Cobol, the numbers were outlandish. With Ramis II, these figures are one-quarter to one-fifth of the cost of developing the same program using Cobol. This, of course, is a visible savings for the company in general," he said.

"The hidden savings comes in the fact that we have a charge-back system at Becton Dickinson and our users are not required to use in-house data processing services," he added. "By using Ramis II, our estimates are quite reasonable and very competitive with application vendors on the outside. Now, many Becton Dickinson data center customers use our in-house services not only for their speed, but for the cost-effectiveness."



# Big Eight Firm Cuts Coding With Audit Aid

NEW YORK — DP auditors at an accounting firm here say they have saved thousands of programming hours by using a preprocessor package which automatically generates error-free Cobol programs for specific audit applications.

Developed by Coopers & Lybrand's Computer Audit Assistance Group (Caag), the package is used by Caag'a 300 field auditors in more than 90 U.S. offices. In addition, there are more than 2,000 worldwide users of the package.

DP auditors at Coopers & Lybrand have used software for more than a decade to perform validations of their audit clients' financial systems.

But there has traditionally been a catch to using software as a validator. No single application package can adequately handle the variety of systems used by different clients. For example, Caag staff perform a large number of accounts receivable validations. An easy, cost-effective way to perform validation of this type is to process this information using the client's processor. But while accounts receivable packages tend to be fairly standard, each client's implementation has unique characteristics which must be considered in performing an effective audit.

"During an auditor's busy season, his environment changes every few weeks — sometimes every few days," according to Pamela Pfau, senior manager of technical communications for the Computer Assistance Group at Coopers & Lybrand. It is important for Coopers & Lybrand's staff to have a programming language available which is consistent and easy to use in different environments, she added.

"Furthermore, though many DP auditors are knowledgeable in programming, their job is to audit, not to develop software."

In 1974 Caag developed Auditpak II. Since then, the package has enabled Coopers & Lybrand to complete work on schedule and remain within budget constraints during busy audit periods, according to Pfau.

"In addition, since switching to Auditpak II, applications have been easier to maintain," she added. "This is important since clients may modify their systems from year-to-year. And these changes may affect the way an audit is performed."

Auditpak II is generated by completing a questionnaire. The form

*(Continued on SR/74)*

*Building a Complex Application*

# High-Level Language Fits Flexibility Needs

SAN FRANCISCO — When purchasing an order management package, flexibility is the hardest quality to find.

Noesis Computing Co. discovered the above fact when it developed an order management package for the Hewlett-Packard Co. HP 3000 minicomputer.

Order management systems require custom fitting for factors like discount schedules, promotional schemes and invoice and statement formats for each company's practices. Noesis built its Ordertrak package using Quasar Systems Ltd.'s fourth-generation Powerhouse software.

The Ordertrak package was developed in under one-third the time of a Cobol system, which helped Noesis minimize the amount of research and development required to move from custom order management systems to a generic software package.

According to Bob Shelley, Noesis' vice-president of consulting, "For the first time, the systems developer had a reasonable way to deal with the fact that most users don't know what they want when they start out, especially if they're going from manual to computer operations for the first time. With Powerhouse, they can tell you what they want; you make the changes that afternoon and show them the new screen, report or process the next day."

Ordertrak performs core functions involved in the order management process: on-line order taking, inventory management, production of pick lists, back ordering, multiple pricing schedules, invoicing, accounts receivable and cash collection.

On the other hand, there are three areas of the order process where Noesis found that custom programming is required: management reporting, order acknowledgments and customer invoices and screens for data order entry.

In this dynamic situation, Quiz, the Powerhouse report writer, is used by Noesis programmers to build reports such as sales history comparison by product and region in as little as two hours.

Customizing the Ordertrak package for *Research* magazine, a San Francisco-based publication aimed at stockbrokers and investment counselors, proved to be a challenge. Research Services, the magazine's parent company, had order management needs that have as much in common with product distribution as with conventional subscription fulfillment.

Each issue of *Research* profiles a number of companies of interest to the investment community. These profiles are independently prepared, and featured companies pay a fee to Research Services for its assistance in creating articles for publication.

Robert Scavullo, president of Noesis

Any subscribing broker can receive free reprints of *Research* articles, and a single reprint order sometimes runs to hundreds of copies, according to Thomas A. Elliott Jr., editor-in-chief of *Research*. Because featured companies are billed for reprints, the magazine needed a system that creates invoices based on reprint orders rather than on magazine subscriptions.

On-line access to any broker's reprint order history was essential to *Research's* order management system, Elliott said. A test project showed that three times as many reprints

*(Continued on SR/75)*

# Big Eight Firm's Preprocessor Assists Auditors

(Continued from SR172)

asks questions about the operating environment, the logic the auditor wants to apply, file names and layouts end the types of reports desired. Auditors have usually been able to learn how to use Auditpak II after completing a one-day course, accordng to Coopers & Lybrand.

"Another benefit of Auditpak II is that it is relatively easy to install on a client's computer system," Pfau said. "Only the load modules have to be edded — e step which usually takes less than a minute. Once the package is installed, e larger task, such as totalling 10,000 transactions, takes about an hour.

"But the most important benefit of using Auditpak II is eudit enhancement. The peckage allows the euditor to perform a more thorough job in less time. And certain control concerns can be eddressed which cannot be addressed manually," she added.

Secondly, programming hours can be reduced by twentyfold. For example, writing an eccounts receivable eging program in Cobol could take ebout 30 hours. The same program can be written using Auditpak II in about 90 minutes. And with the questionneire format, the program is fully documented.

There have been several other segments of the Auditpak II package which have improved the overall efficiency and accuracy of Caag audit tasks, eccording to Pfeu. For example, the questionnaires furnish environmental specifications and parameters for the desired program — basically providing a structured methodology. Secondly, error- and syntax-checking capabilities allow editing of user-provided input from the questionnaires. Lastly, people with little DP experience can learn how to use the package in e short period of time. That eliminates a long-term setup procedure.

Since its inception in 1974, the Auditpak II packege has undergone many changes. Since each modification is upward compatible, existing software applications do not have to be changed.

For example, Coopers & Lybrand was recently called in to eudit fixed assets in an agricultural operation. The task was extremely complex because the firm had a large number of formulas and options. And because the firm had recently changed its processing system, program analysis could have taken several hundred hours. Instead, the Coopers & Lybrand auditors wrote Auditpak II programs to reprocess the firm's first year data. As a result, substantial errors were found in the company's new system. The eudit took 140 hours.

*Using Configuration Management*

# Technique Eases Program Changes

By James Lerner
Special to CW‡

Communications is really the issue et hand when we discuss programmer productivity. If the computer could really understand exactly what the programmer had in mind when a program was being written, a lot of bugs would never exist.

Further, if the programmer really understood perfectly the problem thet the end user had wanted solved, another entire cless of bugs would be banished forever. That day is not yet et hand. When it is, programmers will exist only in the files of corporate personnel departments. Until then, we will continue to communicate with each other — and with our bug-ridden software — in an imperfect manner.

On e project level, communications problems arise whenever two people attempt to use the same document or program module. For example, ambiguities in a document frequently lesd to different and incompatible interpretations of its meaning. Similarly, when two people on a project decide to fix a program bug — assuming they both know where the bug lies — they will probably have slightly different fixes for the problem. Sometimes one or both of the fixes will be correct, sometimes not. Here is e perfect plece for a computer-based tool to help the developers minimize communications problems and thus improve productivity.

Configuration management is a procedural technique for maneging changes to a program or document. It is the bureaucratic process necessary to maintain control over e normally chaotic etate of evolution of a program or document. It started before there were programs, when engineering change orders were used as e mechanism for documenting chenges to hardware components. After the changes were made, a qual-

(Continued on SR176)

*An Objective Third Party*

# Performance Monitor System Proves Its Mettle

MIDDLEBURY, Conn. — When Storage Technology Corp. (STC) told Uniroyal, Inc. that STC 8650 disk drives provided better quality for less money than the IBM 3350 disk drives running at Uniroyal, Wayne Bond, manager of computer operations, was ready to listen. To build its case, STC suggested the use of Reliability Plus (R+), a hardware performance monitoring system from University Computing Co. (UCC) of Dallas.

"R+ was the only objective third-party monitoring system I was familiar with," Bond explained. "It not only monitors the performance of each hardware device in an installation, it compares that performance to monthly averages pooled from more than 600 UCC-R+ customers across the country."

These comparisons enabled Bond to assess a vendor's performance against other users of the same equipment, as well as against compatible equipment from different vendors. "I decided to use the system to make sure we got the same performance from STC disk drives that we had been getting from IBM," he said.

Uniroyal installed R+ in early May 1981 and made special arrangements to input five months of IBM disk performance data into the system. This historical data provided comparative figures for the new STC disk drives installed in September. Thereafter, the first task facing Uniroyal was the definition of all hardware equipment to be monitored by R+.

Today the Uniroyal computer data center here contains an IBM 370/3033 with 12M bytes of memory running under IBM's MVS operating system. On-line storage consists of 52 STC disk drives. There are 11 STC tape drives and three STC 1200 line/min printers. The mass storage device is an IBM Model A-3, containing the equivalent of 30,000 tape volumes.

"Three or four months after the drives were installed, it seemed as though STC disk performance was

*(Continued on SR/76)*

## Language Meets Flexible Needs Of Software Firm

*(Continued from SR/73)*

could be placed via phone marketing, but that *Research's* salespeople needed to know which reprints a broker had ordered in the past.

*Research* also looked at its computer system as a profit center that provides new customer services. Marketing surveys, for example, were previously done by mail. *Research's* computer system makes it easy to do surveys as part of the telephone marketing process.

The system provides on-line management of *Research's* very large inventory of reprints and of order fulfillment, most of which takes place in the company's Los Angeles facility. Reports, pick lists and labels are produced on-line during the day.

After the reprint inventory system was in operation, *Research's* newest product line — videotaped company profiles that brokers can use in sales presentations — reached a level where its inventory management needed computerization. The videotapes presented quite different problems from the reprints: The tapes are distributed from a different location and are only lent to subscribers. In addition, videotape-usage processes and screens had to be added to the existing broker order history data base.

Because Ordertrak is based in fourth-generation languages, Noesis was able to merge the handling of this new type of inventory into *Research's* system instead of adding a new system.

# Configuration Management Facilitates Change

*(Continued from SR/74)*

ity assurance procedure would check the final product and sign off to allow the engineer to return the drawings and final product to the library for safekeeping.

Project management could be assured that the library kept the last working copy on hand in the event of failure in the new design. The library kept track of who made changes to a component, who was currently making changes and what the purpose of the changes was. By fully documenting the change history of a component, testing and future updating became simple procedures.

With the advent of the information age, engineering change orders became a cumbersome device for controlling changes. Configuration management must move to the computer as an increasing quantity of information becomes available on-line.

Let's examine how an on-line configuration management system fits into a project life cycle. We'll use a software project for this example. Depending on the nature of a project, one might break it into some subset of the following phases:

- Preproposal.
- Proposal.
- Requirements Definition.
- Architectural Specification.
- Functional Specification.
- Detailed Design.
- Code.
- Unit Test.
- Integration.
- Maintenance.
- Enhancements.

Each of these project phases involves paperwork, and much of it is or can be performed using a computer, either for word processing or for program development. Configuration management allows changes in each program module and document generation to be tracked. When someone wants to know the difference between the proposal originally submitted and the system finally agreed upon, the answer may be found in this central repository.

If this hypothetical project had 10 people writing the architectural specification, the configuration management system would provide the means to ensure that they are each making changes to chapters that no one else is changing concurrently. When the changes are complete, each chapter may be placed back into the library, allowing others to access it and allowing the use of various computer-based tools such as file comparators, requirements analyzers and spelling checkers.

If the first attempt to write a program to solve a problem was always successful, there would be little use for configuration management. However, programs are usually written with bugs built-in. Configuration management is concerned with tracking changes in programs, but is not specifically concerned with the nature of the change.

A natural addition to a configuration management scheme would be a trouble reporting process. This would allow a more detailed description of bugs and their attempted fixes. A trouble reporting procedure should allow a quality assurance inspector to verify that a bug existed and that repairs to the program fixed the bug.

A rigorous quality assurance program can only succeed when a formal system for reporting changes is used. A successful trouble reporting mechanism can improve productivity by centralizing and protecting this information and by making it easily accessible.

### Suggested Attributes

A good configuration management system should have the following attributes:

- Positively identify all configuration control items.
- Maintain accurate records of the status of configuration control items.
- Enforce policies regarding allowable authors.
- Provide fail-safe file protection and rollback.
- Tracking of problem/fix history.

Configuration management, properly implemented, can be the basis for significant productivity enhancement. It can help to give a sense of confidence that a project is well managed by providing ample documentation of changes. Rollback capability reduces the risk of incorrect modifications. Configuration management provides traceability and accountability for all changes, from project inception through the end of the product life cycle. Developers are provided with a stable platform from which to make changes, in isolation from co-developers. This may result in lower development, testing and maintenance costs and faster throughput. The net result: a gain in project productivity.

*Lerner is president of Cogitech, a West Newton, Mass., firm that specializes in configuration management products.*

# Key Guidelines Outlined for Productivity Tool

By David W. Cotlove
Special to CW‡

Unable to meet their users' demand for software, DP managers are turning with increasing frequency to productivity tools or application generators in an effort to reduce their vast project backlog. However, evaluating such products is difficult because many DP departments have little or no experience with this type of product.

Often, the term productivity is equated with initial development. This is a serious mistake. To be of value, a productivity tool must solve problems in three key areas: initial development, ongoing maintenance/enhancement and documentation.

The absolutely static program is a rarity. Typically, changing corporate directions, demands of the marketplace, regulatory changes, or just the creativity and imagination of users creates an urgent need to modify, improve or update software. This constant demand for changes requires an enormous investment of effort by the data processing staff. A tool that provides faster initial system development without also speeding up the modification effort will only serve to provide users with more software that cannot be kept up-to-date.

The time required to properly document software and to update it to reflect modifications is another substantial burden on the data processing staff. When the pressure becomes acute, it is usually solved by delaying documentation. Unfortunately, the piper must be paid. When it comes time to modify the software, the lack of documentation — or, just as bad, out-of-date documentation — results in unnecessarily time-consuming maintenance. Once again, a tool that rapidly produces undocumented software makes it increasingly difficult to keep that software current.

Many productivity tools create, after the user has entered a definition of the desired result, a source program in a high-level language such as Cobol. This program can then be modified, if necessary, to perform functions beyond the productivity tool's capability to accommodate, and is then ready to be compiled or interpreted.

It is doubtful that code generators will ever significantly solve productivity problems. Although the initial code is produced more quickly, all the old problems of learning, understanding, supporting, documenting, maintaining, modifying and enhancing the code remain. In short, code generators typically fail to address two of the three key requirements for increased system productivity: ongoing maintenance and documentation.

Once an application is designed, it must be described in a form acceptable to the available system software. Traditionally, this has meant writing a program. Productivity tools attempt to streamline this process of description in one of two ways. The first, designated a procedural approach, requires the user to write what appears very much like a program using instructions that do the work of many, say, Cobol statements.

The second approach, referred to as specifications, requires the user to describe the specifications, or attributes, of the desired result. Users are prompted to provide specific items of information, and input screens and report formats are "painted" on the screen. The productivity tool then executes the necessary instructions or procedures to achieve the intended result.

The specification approach is clearly preferable because it is easier and more natural, requiring the user to explain only what is wanted and not how it is to be accomplished. Unfortunately, it is not practical to provide for the entry of specifications for every conceivable situation without making specification entry unreasonably cumbersome. For example, complicated and interrelated edit checks on multiple input fields are difficult to incorporate into a specification approach, but are easily described using a procedural approach.

The best method is a combination — a specification approach for the more common situations and an integrated procedural approach to handle exceptional situations.

Just as traditional programs can be compiled or interpreted, so can the specifications (or procedures) be used to describe an application to a productivity tool. The trade-offs are identical to those for traditional programs. Compiled specifications (or procedures) execute more quickly, but require recompilation after each modification, after each change to the data record descriptions and after each bug correction. Conversely, interpreted specifications (or procedures) place greater demands on the hardware, but provide greater time savings during development and

(Continued on SR/78)

# Performance Monitor System Proves Its Mettle

(Continued from SR/75)

excellent in some months and unsatisfactory in others," Bond explained. "So with the strength of R+ statistics and our own documentation behind us, we got the STC team in here to talk about our problems. They suggested some improvements, and disk drive performance has improved every month. Today, we continue to carefully watch the R+ statistics as we begin to think about renewing our STC contract."

R+ helped Uniroyal reduce hardware failure in STC tape drives, Bond noted. "We had documented problems in this area and had requested better service for the drives. The new emphasis on R+ statistics fortified our position, and STC agreed that perhaps service on tape drives had suffered because of the attention and special efforts paid to Uniroyal's disk drives."

To remedy the situation, an STC tape drive specialist was brought in to Uniroyal to examine each drive. He suggested that a tape cleaner might help minimize further troubles. "This seemed to do the trick because we have had good results ever since," Bond said. "The additional attention we received was partially attributable to R+ figures backing us up in our service demands.

"R+ served to better organize and highlight the problem areas to show us that we were in the bottom third of the country in mass media performance," Bond said. "Obviously that showing was not consistent with our efforts. If it weren't for R+, I would have to be satisfied with that type of vendor response."

Uniroyal had purchased 6M bytes of Intel Corp. memory for its IBM 370/158. In the beginning, R+ statistics confirmed what Uniroyal already knew: The memory was failing too frequently. In fact, monthly R+ reports showed Uniroyal was one of the worst Intel memory sites in the nation. Intel had put every level of its field engineering resources on the problem but failures continued.

"In looking at the problem, we went back into the history log and saw that when the memory went down, the CPU usually did not. From these statistics we were able to conclude that downtimes seemed related to power failures at the data center," Bond said. "Since installing a motor generator to help smooth out the power surges, we have experienced four power fluctuations but no memory failures."

# Key Guidelines Noted For Productivity Tools

(Continued from SR/77)

maintenance. Since this is precisely the objective of the productivity tool, interpreting is preferable to compiling. An investment in additional hardware power to overcome the demands of the interpreter will almost certainly be more than made up by savings of staff time.

Many productivity tools handle only a specific function such as data entry, sorting or reporting. Each of these tools requires its own description of the data to be processed — it is the user's problem to put them all together to form an integrated application. It is far preferable to invest in a product that provides tools to handle all functions required in an application and in which each function references a common data dictionary.

A productivity tool should become the backbone of your data processing operations. It is critical that you invest in a true tool and not just a fancy toy.

A productivity tool must be sufficiently powerful and flexible to handle most application requirements. But real-life applications are complex, and there is a danger that the productivity tool, in order to handle this complexity, will become every bit as cumbersome as the traditional methods it was intended to replace.

Many tools look easy and flashy when used to produce relatively trivial applications. But they may be unable to cope with real-life situations or the effort to make them do so may not be worthwhile.

It is, however, important to note that a tool is unlikely to be able to perform 100% of your application requirements. But if these special functions are coded using traditional methods, it may be difficult to integrate this code with the other functions developed using the productivity tool.

Some tools that can successfully handle the complexities of real-life applications can do so only in the hands of a data processing professional.

But the more that the end user can do, the less burdened the data processing staff will be.

Consequently, a good productivity tool is designed so that even for complicated applications it is truly easier to use than traditional methods, it is easy to integrate traditional programs to supplement the capabilities of the tool and a less skilled user can use the tool to do as much as he is capable of doing.

*Cotlove is vice-president of operations at The Office Manager, Inc. The Seattle-based firm develops software for Wang Laboratories, Inc. computers.*









*'Makes It So Convenient'*

# First User Lauds IMS/DL/1 Test Utility

By Lois Paul
*CW Staff*

LOS ANGELES — An IBM IMS/DL/1 on-line testing utility has helped reduce the time and complexity involved in data base debugging and problem determination for a medical center here, which is one of the first users of the product.

"It is funny that there isn't anything else on the market actually that does what it does so well," said Steve Dalsimer, senior data base analyst for Cedars-Sinai Medical Center. "I have a feeling that some shops have actually taken the time to write it themselves, because it is very difficult to get along without it, I would think. It would just be a real nuisance."

The product is the Data Base Alter/Display System (DBDS), which was developed by David Balch, president of A Few Good People, a small software development firm located in El Monte, Calif. Cedars-Sinai began using the product four years ago when Balch was doing some consulting work for the institution.

Cedars-Sinai's DP facility consists of an IBM 3033 and Amdahl Corp. V/6 Model II running DOS/VSE under VM with CICS and DL/1 data bases. There are approximately 120 people in the information services group, including operations and programming staff.

The DBDS utility is being used by Cedars-Sinai to interrogate selectively DL/1 data bases to track down problems both in testing and in production without affecting applications programs.

"DBDS just makes it so convenient," Dalsimer explained. "It is so much easier with this utility to do it on-line. It would be a horrendous job under a batch utility." The major benefit of the product for his group has been in saving time during debugging and problem determination.

Dalsimer had not gone shopping for a utility of this type, although he did look at IBM's on-line debugging facility and decided against it. Cedars-Sinai also has On-Line Software International, Inc.'s Intertest interactive test controller, which allows programmers to test DL/1 data bases. "We use it for [IBM] Vsam files, but DBDS is so much better, we don't even bother with it [Intertest] for DL/1," he said.

DBDS enables Dalsimer's group to step through a DL/1 data base on-line, separate from the major applications at the medical center, which include systems for the departments of Pharmacy, Radiology, Billing and Receivables and Admissions, Discharge and Transfer. "So in case the application program isn't working, you can actually go and see what is out there, what is in the data base. You can modify it, whereas otherwise you might have to write a Cobol program to do a modification or use

*(Continued on Page 58)*

## *'FTP' Transfers Files Between Micros, IBM Mainframes*

SAN FRANCISCO — OBS Software, a division of On-Line Business Systems, Inc., has announced a utility program for file transfer between microcomputers and IBM mainframe computers.

File Transfer Protocol (FTP) comprises two major components: the mainframe program, which runs under either IBM's TSO or VM/CMS; and the micro program, which runs on the IBM Personal Computer with IBM DOS, Apple Computer, Inc. Apple II+ with Apple DOS or Digital Research, Inc. CP/M and Intel Corp. 8080-based or Zilog, Inc. Z80-based machines running CP/M.

Originally developed at the University of California at Los Angeles, FTP reportedly contains a layered protocol.

FTP costs $4,000, including 10 copies of the micro version. Users may obtain authorization to support more than 10 micros at a fee of $50/micro. OBS Software is located at 115 Sansome St., San Francisco, Calif. 94104.

# Intermetrics Offers Byron PDL Release

CAMBRIDGE, Mass. — Intermetrics, Inc. has announced the release of its Byron Program Design Language (PDL) and support software tools, which are program development and documentation tools based on Ansi-standard Ada, the Department of Defense-sponsored language.

Intended for use on IBM 370 and plug-compatible processors, the Byron language was designed to allow programmers to express the specification or the design of a program, while assisting in all phases of the software development process, according to a vendor spokesman. The Byron tools are intended to automate the production of documentation for the programs that are developed with Byron PDL.

Byron reportedly allows software developers to use a notation that promotes accessibility and lessens the chance of errors during software development. Military specification and other required documentation formats are extracted directly from PDL or source code, depending on the phase, the vendor noted.

The Byron tools also generate design documents, including type dictionaries. The Byron product comes in two versions. Byron/5000 processes up to 5,000 lines of Byron code and costs $25,000. Byron/1M processes an unlimited amount of code and costs $75,000. More information is available from Intermetrics at 733 Concord Ave., Cambridge, Mass. 02138.

# CICS-IMS Map Generator Bows

SOUTHFIELD, Mich. — Business Information Systems, Inc. has announced an IBM CICS-IMS map generator for OS and DOS systems.

Screens Made Easy (SME) is a free-form Interactive screen design aid. Once the screen is complete, it is reportedly possible to generate either IBM's Basic Mapping Support or Message Format Services code.

The screen design process is not dependent on the environment in which the screen will function, according to the vendor. SME is said to be flexible and language independent and to provide prototyping capabilities.

Prices start at $6,000 for DOS and $7,500 for OS systems, a spokeswoman said from Business Information Systems at 21819 W. 9 Mile Road, Southfield, Mich. 48075.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# 'Easy Calc' Rivals Micro Finance Modeling Tools

ROCKPORT, Mass. — Para Research, Inc. has announced a financial modeling package called Easy Calc for the IBM System/34.

Intended to rival the capabilities of financial modeling tools on microcomputers, Easy Calc includes an advanced cursor movement that reportedly provides for faster keying with fewer keystrokes. Its shorter screen-to-keyboard distance is designed to reduce eyestrain. The software also has the ability to hold both rows and columns to facilitate the development of work sheets.

Easy Calc uses a variable work sheet size of up to 52 col. by 999 rows. Its mathematics capabilities are said to allow the use of 96-char. formulas and nesting of parentheses. The software permits block calculations as well as horizontal and vertical calculations. Full or partial work sheets may be calculated, the vendor said, and built-in error detection pinpoints the exact position in a coordinate to be corrected. A consolidation feature reportedly will combine up to 998 work sheets into one for the purpose of summarization.

Easy Calc requires 38K bytes of memory and 400 blocks of library space. Release 1.0 of the product costs $1,000 and includes documentation. Para Research said from Whistlestop Mall, Rockport, Mass. 01966.

*For IBM GDDM, ICU Users*

# Interfaces Allow Chart Production

WASHINGTON, D.C. — Decision Resources Corp. has announced custom software interfaces that are said to allow users of IBM's Graphical Data Display Manager and Interactive Chart Utility to produce charts on the Matrix Instruments, Inc. slide maker, the Xerox Corp. 6500 color graphics printer and the Tektronix, Inc. 4691 ink jet plotter.

All colors from an IBM 3279 terminal can be reproduced on slides, paper or transparencies. The custom interfaces use a vector-to-raster converter to reduce the work load on the host. The interfaces can be configured as an IBM 3287 printer, an RJE station, an Ascii terminal or an IBM 3270 terminal.

The interface costs $10,000 per CPU from Decision Resources on the 3rd Floor, 1701 K St. N.W., Washington, D.C. 20006.

# *DG, CGIS Announce Software Available for 32-Bit Systems*

AUSTIN, Texas — Data General Corp. and Comsat General Integrated Systems, Inc. (CGIS), a Communications Satellite Corp. (Comsat) company, have jointly announced that CGIS' Tegas, Texsim and Super-Compact software are now available on DG's 32-bit computers.

Tegas is a computer-aided program said to provide electronic test engineers with a logic and timing simulation system. Texsim reportedly includes design and logic verification for bipolar and MOS circuits. Super-Compact is a computer-aided design tool for high-frequency and microwave circuits.

For MV/4000 systems, the price is $8S,000 for Tegas, $37,500 for Texsim and $4S,000 for Super-Compact. CGIS is headquartered at 7701 N. Lamar Blvd., Austin, Texas 78752. DG is located at 4400 Computer Drive, Westboro, Mass. 01S80.

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GENERAL ELECTRIC

# MCBA Announces Release 2 Of Accounts Payable Package

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced Release 2 of its Accounts Peyeble (A/P) package written in Ansi '74 Cobol for Texas Instruments, Inc. DS 990, Business Systems 300 or larger systems.

A/P accesses vendors by either name or number and can track vendor performance statistics, a spokesman said. Federal 1099 Nonemployee Compensation Forms may be printed. Duplicate payment of invoices is prevented through e verification system and warnings displayed on invoice discrepancies. A/P maintains vouchers for recurring payments. Both paid and unpaid invoices are displayed with the corresponding payment and check number. The user can generate an audit trail, if desired.

An A/P Distribution to General Ledger (G/L) report can be printed in either detail or summary format. Release 2 includes function key options displayed on the screen. Default values and existing fields in change mode can be changed with edit keys. A/P was designed with a larger G/L account number, which allows for a format selectable by the user, the spokesman said.

A source code license costs $2,000 from MCBA at 2441 Honolulu Ave., Montrose, Calif. 91020

# *Tektronix Graphing Tool Out*

BEAVERTON, Ore. — Tektronix, Inc. has announced Plot 10 Easy Graphing II, a graphing command language said to be compatible with all Tektronix storage and raster terminals.

It reportedly offers interfaces for two distinct user types and is available for either host or programmable terminal use. Plot 10 Easy Graphing II is a decision-making tool for professionals engaged in repetitive technical analysis or for casual users who need occasional graphics reports.

Features include support for both monochrome and color displays, English-like commands, a zoom feature to enlarge portions of the graph and interactive positioning of textual notation in any location on the graph, the vendor said.

Using a Tektronix 4660 series plotter, Plot 10 Easy Graphing II can produce color hard copy on paper or transparency via all Tektronix terminals. It also supports the recently introduced 4691 Color Graphics Copier.

Easy Graphing II is available in Fortran source code for host mainframes or in object code for Tektronix 4100 series programmable terminals with Digital Research, Inc.'s CP/M86. The host version, priced at $2,600, reportedly can be accessed by an unlimited number of users in e multiuser environment. The local version, priced et $310/copy, reduces host-terminal communications and data storage cost, according to the vendor.

Tektronix can be reeched through P.O. Box 500, Beaverton, Ore. 97077.



# First Users Give DBDS Rave Reviews

*(Continued from Page 53)*

some other utility that would be e lot more cumbersome," he said.

Another user of DBDS is John Boone, vice-president of the Santa Monica consulting firm, Productive Data Management, Inc., and former director of data base administration at Cedars-Sinai. The author of several software products that are being marketed by IBM, Boone said of DBDS, "You know you could write one yourself, but you never have time. It has done such a good job that it really saved us a lot of time in some very critical situations throughout our five or six years."

Boone's firm has recommended DBDS to all its consulting accounts. He finds it useful in helping to get his customers up and running again very quickly when they encounter data base problems. He explained that when there is e data base logical integrity problem, data base records are unavailable until the segment is repaired.

"To write a patch program, to go in and do it, sometimes will take days to weeks, depending on how difficult it is. With this utility, you can actually bring up the segment in question, change it and put it back end make it immediately available then for the users," Boone went on to say.

The utility is particularly appropriate for customers who are just getting started, because it helps them make changes to their test systems without getting bogged down with the complexity of programming languages and IMS, he said. "We recommend it, because in the matter of e couple of hours worth of training — and some of them don't need any training if they know IMS — they can be put to use right eway," he explained.

Boone admitted that there is also e selfish motive involved in encouraging his clients to use DBDS to deel with their deta base problems. "If they are down for three days trying to write e program to fix some data bases, there is not e lot for us to do. It is important for us that the eccounts stay up as long as they can."

*Monitors System Resources*

# Accounting Package Fits VAX-11

BRAINTREE, Mass. — Computer Information Systems of Massachusetts, Inc. has announced React, a menu-driven resource accounting package for Digital Equipment Corp. VAX-11 computers under the VMS operating system.

The package monitors and bills for system resources and software usage on single VAX/VMS systems or networks connected with DEC's Decnet, a spokesman said. Billable resources include connect time, CPU time, page faults, buffered I/O, direct I/O, volumes mounted, pages printed, disk storage and software license fees.

React also maintains statistical information on interactive jobs, subprocesses, detached, batch and print jobs, log-in failures, peak working set size and peak page file usage.

Rate assignments can be set per resource and per node on a user-by-user basis, the spokesman said. Extraction of resource usage information can be set to run automatically at a user-specified time or can be executed interactively. A variety of reports are produced.

React costs $2,995 from 165 Bay State Drive, Braintree, Mass. 02184.

## System/38 Gets Report Writer

OAK BROOK, Ill. — Michaels, Ross & Cole Ltd. (MRC) has announced MRC-Reporter, a data dictionary-driven report writer for the IBM System/38.

The product allows nontechnical users to create reports from multiple physical files at one time, a vendor spokesman said. The user reportedly does not need to understand the data base or learn an English-like language.

All reports are interpretive. Reports may be saved after execution and are automatically placed on a menu for the user. Reports may be accessed from the internally maintained menu or added to user-defined menus.

MRC-Reporter costs $1,140 with an introductory price of $990 available for a limited time from MRC at Suite 501, 1301 W. 22nd St., Oak Brook, Ill. 60521.

## Parallax Offers On-Site Training On Spreadsheets

NEW YORK — Parallax Systems, Inc. is offering a one-day on-site training course on spreadsheet programs.

The course focuses on Parallax's Execucalc spreadsheet program for users of mainframe processors running IBM VM/CMS and MVS operating systems. The course also offers training in Visicorp's Visicalc spreadsheet program, the vendor said.

The course was designed to enable attendees to build a spreadsheet model while learning how to use both Execucalc and Visicalc. No prior knowledge in spreadsheet software is required. At the end of the one-day session, attendees will have the skills needed to develop spreadsheet applications such as budgeting, market planning and profit and loss statements, the vendor said.

The course, titled "Visicalc Through Execucalc," is limited to 12 people per session. The course fee is $750/day plus expenses. Parallax is located at 331 W. 71st St., New York, N.Y. 10023.

## RPG-III Course Announced

WOODLAND HILLS, Calif. — Automated Training Systems, Inc. has released a self-study, hands-on introductory course to the primary language of the IBM System/38.

Entry Level RPG-III is said to explain such things as the RPG-III program cycle, tables and arrays, files and data structures and physical and logical files. Course materials consist of audio cassettes, manuals with visuals and text and a diskette with sample programs and exercises.

The course costs $695 from the firm at Suite 107, 21250 Califa St., Woodland Hills, Calif. 91367.

## *DG Announces Third-Party Aids For Eclipse*

WESTBORO, Mass. — Data General Corp. has unveiled third-party applications software packages for its Eclipse systems.

The third-party packages include insurance software from Worlco Data Systems for $100,000 to $300,000; business software from Computer Associates International, Inc. for $6,000 to $15,000; and financial analysis and reporting software from Lupfer and Long, Inc. for $4,000 to $10,000.

More information is available from Data General in Westboro, Mass. 01581.

# Archive, Retieval Aid Out for VAX/VMS

BURLINGTON, Mass. — Strategic Information, Inc. has announced the release of an archive and retrieval package for Digital Equipment Corp. VAX/VMS systems running Release 3.0 or higher.

Archiver reportedly reduces user disk storage by storing seldom-accessed files on magnetic tape and maintaining an on-line directory of files archived for each user.

The package's user interface is installed as three commands. Each user name contains a directory with a list of archived files. The Archiver also supports all standard VMS file organizations, including sequential files, indexed sequential files and relative files.

Archiver reportedly ensures against tape failures by using primary and secondary tapes for each archived file and by detecting and correcting tape read/write errors.

The software is priced at $5,000 for the VAX-11/780 and VAX-11/782, $3,500 for the VAX-11/750 and $1,500 for VAX-11/730. More information is available from Strategic Information at 80 Blanchard Road, Burlington, Mass. 01803.

# Cromemco Supports I/O Drivers

MOUNTAIN VIEW, Calif. — Cromemco, Inc. has announced software said to allow users to develop custom I/O drivers for use with the firm's Cromix multiuser, multitasking version of the Unix operating system.

Model CXDR is available on 5¼-in. or 8-in. floppy disks. Documentation outlines how to add new character device drivers and explains how primary driver subroutines are handled by the system.

For adding a new remote I/O Processor Character Device Driver, utilities and subroutines are provided that allow character buffering, host answering and C-Bus process control.

The software is designed to be used with both the Zilog, Inc. Z80 Cromix and the Motorola, Inc. 68000/Z80 Cromix-D Dual Processor operating systems. The package costs $595 from the firm at 280 Bernardo Ave., P.O. Box 7400, Mountain View, Calif. 94039.



# 'Diskit' Update For DEC Minis Backs RDS1

LOS ALAMITOS, Calif. — Software Techniques, Inc. has announced Version V07.01 of Diskit, the firm's disk management "tool kit" for Digital Equipment Corp. minicomputers running under the RSTS/E operating system.

Designed for systems running Version 8.0 of RSTS/E, the latest release of Diakit supports the RSTS directory structure RDS1, the vendor said. In addition, Version V07.01 includes several new utilities, including one that restructures the information on a disk, thus making it easier to access; a directory tool which speeds file finding; a utility which reportedly reorders disk directories 30 times faster than previous versions; and a utility which displays complete job statistics and file activity, the vendor said. All patches to Diskit can be installed using the RSTS automated patching facility, the vendor said.

Diskit costs $1,350 for the first CPU. Additional CPU licenses cost $350 each, and an update service costs $295. The vendor is located at 5242 Katella Ave., Los Alamitos, Calif. 90720.

# Prime Changes PDMS Price Plan

NATICK, Mass. — Prime Computer, Inc. has announced new pricing for its Plant Design Management System (PDMS) for chemical process plants, nuclear power plants and other engineering projects.

The new pricing reportedly lowers the entry price for first-time users and provides more flexibility in designing configurations for specific projects. PDMS prices are as follows: Model 2250 Initial license, $200,000, monthly usage and maintenance, $4,200; Model 250-II, $200,000 and $4,200, respectively; Model 550-II, $250,000 and $6,700; Model 750, $300,000 and $10,000; and Model 850, $300,000 and $10,000, according to the firm.

Prime is located at Prime Park, Natick, Mass. 01760.

# Courses Cover Ramis II, Focus

FALLS CHURCH, Va. — Performance Syatems Group has unveiled a video education series for users of fourth-generation software systems, including Mathematica, Inc.'s Ramis II and Information Buildera, Inc.'s Focus.

Courses on reporting for Focus and Ramis II are available now, along with courses on data base design, file maintenance, stored procedures and screen management. The courses are geared to serve both end-user and professional management information systems personnel.

Courses are priced at an average of $2,000 to $3,200 each, depending on volume. Performance Systems Group is headquartered at 315 N. West St., Falls Church, Va. 22046.

# Look what we've added to our typewriter.

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Attach an IBM Typewriter Communication Module to the Electronic 85 and you can share information with compatible typewriters, text processors, computers and data networks.

Which means it can be used to retrieve and update information, access public and private data networks, and send and receive documents from across the hall or across the country.

The IBM Communication Module also contains a dedicated 14,000-character receive buffer which allows information to be received while a secretary is typing something else. Or even when a secretary is not present.

The Communication Module emulates TTY asynchronous protocol and uses the full 128 ASCII character set. It transmits over switched or nonswitched lines, via an EIA RS-232C interface, with four operator selectable speeds: 110, 150, 300 and 1200 bits per second.

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*For System/34, 36*

# Equipment Owners Backed

CHARLOTTE, N.C. — Halberstadt & Co., Inc. has introduced the Equipment Maintenance Management System, a software package designed specifically for the IBM System/34 and the recently announced IBM System/36.

The package was designed to help first-time users in the maintenance shop to enter vendor invoices for parts and services and repair orders for in-house repairs into an interactive on-line data base.

The integrated package reportedly includes repair parts inventory control (including automatic adjustment of stocking levels and purchase order generation), equipment repair history analysis (using nationally recognized standards), preventative maintenance scheduling and mechanic analysis.

Targeted toward equipment owners who maintain from 25 to 2,000 pieces of equipment, the package will be available June 15 at a license fee of $9,500. The vendor is located at Suite 136, One Woodlawn Green, Charlotte, N.C. 28210.

# Package Tracks Orders On-Line On Wang VS

VANCOUVER, B.C.— P.M. Sulcs and Associates has announced a route accounting system for the Wang Laboratories, Inc. VS computers.

The route accounting system is said to be an on-line interactive system combining inventory, order entry and order management. As the system is controlling the inventory at the unit level, management can reconcile the movement of inventory through orders, loadouts, delivery, customer credits and returns, according to a vendor spokesman.

Other features of the system include rerouting of orders, summary of purchases for statements, wholesale and corporate rebating, including drop delivery rebating, call order schedules by operator, standing orders, inter-branch summaries and returns analysis.

The package is priced at a one-time charge of $40,000. Further information is available from the vendor at Suite 112, 4240 Manor St., Burnaby, British Columbia. V5G 3X5.

# Calendar System Fits HP 3000s

LAGUNA HILLS, Calif. — Bradford Business Systems, Inc. has announced Speedcal, a calendar scheduling system for Hewlett-Packard Co. HP 3000 computers.

Speedcal allows the user to view a calendar display containing notations for appointments within a three-week window, a spokesman said. The window can be moved a week at a time through function key commands. Scheduling can be done as far ahead as the year 2000.

Users can get more detailed looks from a display of three weeks, a week or an explosion of a given day. A compendium chart points out scheduling conflicts, as well as free time over a period from one day to more than a month. Scheduling can be done by department, name, a predefined list of names, individual or ad hoc.

Appointments can be scheduled, shifted, copied, canceled and displayed or printed. The system can also schedule computer-related activities by date and time, allowing batch jobs to be started with no operator intervention, the spokesman noted.

The product costs $4,500 from Bradford Business Systems, Suite 102, 23195 LaCadena Drive, Laguna Hills, Calif. 92653.

# *Deltak Offers Two Series For IBM Environments*

NAPERVILLE, Ill. — Deltak, Inc. is offering a microcomputer-based training series on common IBM utilities for applications programmers and a multimedia series for entry-level operators on basic console use in an IBM MVS/SP-JES 2 environment.

The micro-based series, "MVS/SP Utility Programs," assumes the student can use correct JCL syntax, code JOB, EXEC and DD statements and construct a simple job step. Students in the five-course series should also understand basic sequential and nonsequential data set concepts and terminology.

The multimedia series, "MVS/SP JES2: Basic Computer Operations," requires computer operators to be familiar with basic DP concepts. The first course in the series explains how to enter commands on secondary operator consoles, while the second course focuses on changing console specifications.

Courses can be rented for an average of $50 to $125 per course per month, depending on volume, or purchased for $1,750 each from Deltak's East/West Technological Center, 1751 W. Diehl Road, Naperville, Ill. 60566.

# VAX-11 Access Manager Updated

LITTLETON, Colo. — Interactive Systems Corp. has released Revision 1.0 of Generalized Burst Trapping Record Access Manager (Gram) for the Digital Equipment Corp. VAX-11 series of superminicomputers.

Gram is designed to handle data items in terms of spatial proximity. It is especially useful in systems that handle photographs, drawings, maps and related data, a spokesman said. The system is an implementation of data management concepts derived from a spatial addressing system that allows almost direct access to all data items within a given region. Gram users can store and operate on area data as well as on point data. Gram can store attribute data in addition to spatial information.

The system can handle up to 32 simultaneous users. Multiple users are permitted to access and edit the same file as long as they do not edit the same region within that file. Journaling and recovery features are included.

The price is $45,000 from the vendor at 5500 S. Sycamore St., Littleton, Colo. 80120.

# Data Retrieval Service Offered

COLUMBUS, Ohio — Compuserve, Inc. has added an independent data retrieval service to its Information Service. Subscribers can retain Information on Demand (IOD) of Berkeley, Calif., for data searches of information on business competitors, schools and institutions with specialized programs and services, computer and electronics-related subjects and other topics.

Compuserve subscribers receive a 20% first-time discount on all labor charges and services. Regular rates are $60/hour for research labor and $14/hour for most articles retrieved. The average cost for a data base search is $200, the vendor spokesman noted. Subscribers access the Compuserve Information Service for $5/hour.

Compuserve is located at 5000 Arlington Centre Blvd., Columbus, Ohio 43220.



# *Package Allows Numerical Entry From Telephone*

NEW YORK — Granada Systems Design, Inc. has announced the Teldear Touch-Tone data entry package designed for use with an IBM Series/1 minicomputer. The Series/1 is used as a front-end processor to a host system.

The package allows users to enter numerical data from any Touch-Tone telephone. Rotary dial phones can be equipped with a Touch-Tone adapter, and portable devices such as hand-held terminals can also be used, the vendor said.

An order entry application allows users to enter orders into the system. Voice instructions instruct and guide the user through each data entry step. If an error has been made, an on-line edit routine immediately alerts the user, vocally, of the mistake, the vendor said.

Data entered is available for immediate use, such as to update the inventory file, shipping file or other files. The package costs from $9,000 to $25,000, depending on features selected, the vendor said.

The vendor is located at 303 Fifth Ave., New York, N.Y. 10016.

# Bakco Enhances Control System

ARLINGTON HEIGHTS, Ill. — Bakco Data, Inc. has announced Version 4.0 of its purchasing control system for Digital Equipment Corp.'s PDP-11 minicomputers.

The enhanced system features regular, blanket, drop-ship and no-charge purchase orders. It provides automatic receiving reports slotted to the correct warehouse locations and monitors the open purchase order until the purchase orders are completed, according to a spokesman for the vendor.

The price of the package starts at $5,800. More information is available from Bakco Data, Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

# Unix Course Gets Rental Policy

CHICAGO — Telemedia, Inc.'s Computer Technology Group has announced a new rental policy for its video-based training course for the Unix operating system.

The first month of rental is now priced at 40% of the purchase price, the second consecutive month is 20% of the purchase price and the third consecutive month is 15% of the purchase price. Customers receieve a credit of 60% of rental fees to apply to purchase of the course, according to a spokesman for Telemedia.

The course overview is priced at $2,100, and the fundamental course for programmers costs $5,250.

More information is available from the Computer Technology Group, 310 S. Michigan Ave., Chicago, Ill. 60604.

# Micro Notes

STSC, Inc. has announced an upgrade to its APL*Plus/PC system which provides an enhanced APL language and application environment on the IBM Personal Computer and Personal Computer XT.

The new version reportedly includes improved execution time, improved use of user-supplied machine language subroutines, tone output using the computer's speaker, additional features in terminal mode and six new system functions.

The APL sorting primitive now runs faster and has the added ability to sort character data tables. User-supplied subroutines can create as well as read APL data variables in the APL work space. To avoid buffer overflow, the system's smart terminal mode uses flow control. Additionally, the size of the communications buffer in APL*Plus/PC can be varied up to 63,000 bytes.

The package costs $595. Current registered owners of the system can receive the software and documentation upgrade for $20 from STSC at 2115 E. Jefferson St., Rockville, Md. 20852.

IBM recently unveiled a version of APL — a language that reportedly takes advantage of the IBM Personal Computer's recently announced Math Co-Processor capabilities — that is said to be capable of exchanging work spaces and data files with an APL system running under IBM's VM/370 asynchronous communications facility. The package will retail at IBM Product Centers for $195.

Also introduced by the vendor is a package called Private Tutor, a self-study system for use in the home, classroom or office on the IBM Personal Computer or Personal Computer XT. The IBM Product Center price is $50. Designed to be used with Private Tutor are Learning DOS 2.0, which is intended to teach users how to employ IBM's DOS (priced at $30), and Learning to Program Basic (priced at $35).

Additional information is available from the vendor through P.O. Box 1328, Boca Raton, Fla. 33432.

# McAuto Unveils Stress Analysis Program

ST. LOUIS — McDonnell Douglas Automation Co. (McAuto) has announced Fiesta, a simplified finite element program for stress analysis. The product runs on Digital Equipment Corp. VAX-11 series computers and is offered on McAuto's Control Data Corp. Cyber 176 mainframe as a remote processing service.

Fiesta is based on hierarchical levels of polynomial equations, thus consuming fewer elements to define a structural model, a spokesman said. Accurate stress calculations are made by raising the level of approximation in the polynomials through a single command.

Fiesta uses three-dimensional solid elements, including tetrahedrons, pentahedrons, hexahedrons and pyramids for linear static analysis of solid and shell-type structures. In addition, the company's Fastdraw interactive graphics preprocessor can be linked to Fiesta for building or displaying finite element models and for displaying deflected shapes and stress contours.

The software is priced at $50,000, plus a $400/mo maintenance fee, or at $1,500/mo for a monthly license, including maintenance. Time-sharing charges vary depending on resources used, from McAuto, through Box 516, St. Louis, Mo. 63166.



# Package Debuts For Law Offices

ROCKVILLE, Md. — An information management package for law offices is now available on Wang Laboratories, Inc. VS computers from Informatics General Corp.

Integrating text and data processing functions, Basis is designed for such management functions as litigation support, attorney work product, internal legal research, case management, personnel records, law library management and conflict of interest situations.

With English language commands, a user reportedly can search the data base by word proximity, key word or phrase or Boolean logic. Each copy of the Basis package costs $70,000, according to the vendor. Informatics General is located at 6011 Executive Blvd., Rockville, Md. 20852.

# System/34 Gets Debugging Tool

AUSTIN, Texas — Softron, Inc. has announced a release of its Interactive Debugging Monitor (IDM) for use with RPG-II on IBM System/34 that is said to allow modification of indicator status and field contents during debugging.

Version 2.0 reportedly features snap dump printouts in addition to interactive debugging and a trace facility for recording and printing statements that execute.

IDM, said to work with both batch and interactive programs, costs $750 with multiple-site discounts available. A free demonstration diskette is available from the vendor. Softron can be reached through P.O. Box 27003, Austin, Texas 78755.

# First Bell DCS Hardware Interface Installed

By Jim Bartimo
CW Staff

TUSCON, Ariz. — One of the first American Bell, Inc. Advanced Information Systems' Distributed Communications Systems (DCS) digital hardware interfaces — announced in January as a means of connecting multiple analog Dimension private branch exchanges (PBX) — has been installed at the University of Arizona here recently.

Tying together two Dimension 2000 PBXs with Feature Package 8, the DCS creates a single system of 6,200 ports in a private network. A third node is scheduled to be added in September, bringing the test site to 8,500 ports.

"We're a pretty large user," said project manager Vic Robeson. "Because we're so large, we thought only American Bell could help us. I think [Northern Telecom, Inc.] or [GTE Corp.] could have helped us if they were in the area."

The digital characteristics of the DCS interface allows data to be transmitted eight times faster than with conventional means, but data transmission is still achieved through modems for the present. "We have 200 ports that are modem-connected for low-speed transmission," Robeson said, "but will be used for direct digital transmission in the future."

Robeson and his wife Joy Robeson, who is telecommunications manager for the university, looked at a number of private installations at other universities before leaving their Centrex System telephone network behind. "The DCS system will save us $2 million over a four-year period," Vic Robeson said. "We were paying $150,000 to $170,000 per month with Centrex."

Because Centrex is now controlled by the local operating company, some users have seen infighting between the recently divorced American Bell and their local phone company. The operating companies are pushing Centrex, while American Bell is pushing its high-tech networking products. In this case, there was no such infighting, Robeson said.

"When we started negotiating, the split hadn't occurred yet," Robeson said. "If we tried to do the same thing today, it might be a different story. It will be even crazier when they split again."

The biggest advantage of DCS for the university is that it provides it with long-term flexibility. "We feel we're in a period of transition," Robeson said. "This is good for now and allows us to do something different in a few years if we want to."

Perhaps the biggest disadvantage of creating such an all-encompassing network is that for all the savings and control that is achieved, there is also increased responsibility.

The university also plans to add the Dimension energy management package to the system in the fall. This reportedly will allow them to control lighting and 300 air handlers at a savings of more than $30,000 per month.

# Vision 1000 CRT Offers Tilt Screen, Color-Code Board

Vision 1000

MARKHAM, Ont. — Northern Technologies, Ltd. has introduced a CRT said to include a 12- or 15-in. screen with manual or optional remote-controlled screen tilt; low-profile, detached, tiltable color-coded keyboard; and a narrow terminal base with integral keyboard harbor.

The Vision 1000 includes an advanced video and printer port, 80- or 132-col. display and smooth-scroll. The Vision 1000 is also upgradable to Digital Equipment Corp. VT100 and VT101 terminals.

Standard features of the terminal include a green phosphor screen, an English set-up menu and a variable-speed smooth-scroll.

The terminal sells for $1,195 from Northern Technologies at 85 Torbay Road, Markham, Ont. L3R 1G7.

*Network Server*

# Support for IBM's DOS 2.0 Out

MOUNTAIN VIEW, Calif.— 3Com Corp. has announced a network server, support for IBM's DOS 2.0 operating system and remote electronic mail capabilities for its Etherseries local network system used to link IBM Personal Computers.

The network consists of IBM's XT Personal Computer equipped with 3Com's networking hardware and software, allowing up to 10 users to share the XT's 10M-byte hard disk drive and spooling printers, according to a vendor spokesman.

3Com has also added a 30M-byte capacity disk to its 3C600 Network Server, which can be increased to 60M bytes.

The Etherseries network is said to allow operators of modem-equipped personal computers to send and retrieve electronic mail messages by dialing from a remote location into a network server.

The cost of equipping an IBM XT with the network server includes a plug-in circuit Etherlink board for $950 and the server software for $500, according to the vendor.

3Com Corp. is located at 1390 Shorebird Way, Mountain View, Calif. 94043.

# Zidex's Intelligent Data Net Works With Microprocessor

GLENVIEW, Ill. — The Zidex Division of Communications Instruments, Inc. has introduced a data network that utilizes microprocessor-based data collection terminals for primary collection, initial processing and transmission of information to central data concentrators.

Called an "intelligent data network," the system works in conjunction with a microprocessor and is supported by standard application software packages to automate procedures such as time and attendance, job costing, inventory and process control and security access, according to a vendor spokesman.

Up to 254 remote terminals can reportedly collect data by electronically reading magnetic striped cards or standard bar codes.

Central data concentrators can process and generate on-line reports or store data for subsequent on-demand transmission to existing host computer systems, according to a vendor spokesman.

The Zidex Model 90 Remote Data Collection Station is priced at $1,995, according to the vendor.

The Zidex 100 data concentrators cost $3,795.

Zidex is located at 4215 Commercial Way, Glenview, Ill. 60025.


Zidex 100

# VME Board Serves RS-232C

TEMPE, Ariz. — Data-Sud Systems/U.S., Inc. has announced a four-channel virtual machine environment (VME) bus communications board that can be configured for synchronous or asynchronous operation and RS-232C interface.

The DSSE4COM board appears to the system as memory locations. It is said to take up 32 contiguous memory locations that can be placed anywhere in the address field by strapping.

All communication between the board and the system's microprocessor is over the VME bus, according to a vendor spokesman.

The board is available for $1,175 from Data-Sud Systems/U.S., Suite J, 2219 S. 48th St., Tempe, Ariz 85281.

*From Honeywell Division*

# RDE Net Switching Expanded

DALLAS — The Action Communications Systems Division of Honeywell, Inc. has announced a Roadrunner Digital Edition (RDE) 4000 network switching system. The system is said to be an expanded version of the RDE introduced last year.

Most typical applications for the Roadrunner System are used as multiple-node, tandem networks for long-distance services provided by Bell Laboratories and other communication carriers. The RDE systems typically replace enhanced private switched communications service, common control switching arrangement and electronic tandem networks, reportedly providing maximum network management and cost control of all long-distance communications.

Customers who already have a 1,000-port RDE will be able to upgrade their systems in the field to a 4,000-port system, a vendor spokesman said.

A typical RDE 4000 network switching system for a typical network involving three to four systems, costs approximately $2 million, from the Action Communications System Division at 401 Beltwood Parkway S., Dallas, Texas 75234.

# GTE's Telenet Extended To 40 Additional U.S. Cities

VIENNA, Va. — GTE Telenet Communications Corp. has extended its Telenet public packet-switching network for data communications to an additional 40 cities throughout the U.S. as part of a continuing expansion program.

Expanding local dial-in facilities of the public network is an ongoing program, a spokesman said. The company periodically surveys customers to pinpoint other potential concentrations of terminal users.

The cities where Telenet facilities were most recently installed were chosen as a result of such a survey conducted earlier this year, according to a spokesman.

There are now 290 cities where local public dial-in access is available to terminal users who utilize Telenet to communicate with remote host computer systems. In-Wats service is available to users who are not within local dialing distance of a Telenet facility, a spokesman said

Costs for Telenet service are in the range of $6 to $8/hour regardless of the distances involved. More information is available from the vendor at 8229 Boone Blvd., Vienna, Va 22180.



# Desktop Unit Allows Voice, Graphics Link

Suva Corp.'s Telegraphics 100 Screen Writer

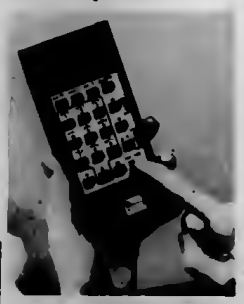
SAN JOSE, Calif. — A desktop telecommunications system said to allow interactive voice and graphics communications between two or more people has been introduced by Suva Corp.

Telegraphics 100 Screen Writer reportedly permits simultaneous voice communications through a built-in speaker phone and graphics communications via a 15-in. viewing/writing screen. Features include the transmission of voice and graphics over a single telephone line. Functions are performed via a light pen touched to the screen.

Screen Writer weighs 30 pounds and is 15-in. high, 15½-in. wide and 15-in. deep and is transportable.

The end-user price is $3,750, and production and deliveries will begin in July from Suva, located at 1774 Technology Drive, San Jose, Calif. 95110.

# Port-A-Store Features 4K Bytes



Model 740 Port-A-Store

ST. LOUIS — Interface Technology, Inc. has announced a terminal product, the Model 740 Port-A-Store, said to be a hand-held, portable data entry device featuring 4,000 characters of memory and visual display capabilities.

The 740 Port-A-Store reportedly allows the user to store and review data off-line. With the 740 on-line, the user can enter data manually or transmit stored data, one line at a time, to Interface Technology's own Total Entry System or to other existing voice-response-based data collection systems.

The 20-key, battery-operated unit is said to transmit Bell Laboratories' Touch-Tone signals.

The 740, including carrying case, battery, acoustic coupler and instructions, is priced at $333 each. Interface Technology is located at 10500 Kahlmeyer Drive, St. Louis, Mo. 63132.

"I KNOW IT BELONGS TO YOU, BUT IT'S STILL NOT A PERSONAL COMPUTER."

# Personal computers in the office — personal or computers?

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Personal Computers? Micros? Desktops? Call them what you will, they are all integral parts of your OA strategy. The personal computer phenomenon must be analyzed and tracked if it is to be used effectively. In the next OA Focus section of *Computerworld OA*, we'll examine how personal computers will affect new and experienced computer users, their work habits and staff requirements. We'll look at management strategies, user experiences and key product offerings. Users who have lived through the process will suggest methods to tie personal computers into a total organizational network or to keep them as personal data bases. And, we'll have an update on information centers.

In this issue, we'll also have an interview with author Alvin Toffler as well as articles on subjects such as information systems, measuring productivity, data base management systems and a productivity study on electronic mail.

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*Emulates 3278 Terminal*

# Irma Interface Enhanced

ATLANTA — Technical Analysis Corp. has announced enhancements to its existing Irma Decision Support Interface said to provide data transfer and IBM 3278 terminal emulation capabilities for IBM Personal Computers via direct native mode.

Enhancements to Irma include support of IBM 3278/3279 Model 3 and Model 4 display formats, full support for the IBM Personal Computer XT and an APL terminal emulation option, Irma has also reportedly been enhanced to support emulation of the Model 3 and Model 4 devices with vertical scrolling functions.

The enhancements are supplied at no additional cost, according to a vendor spokesman. The APL terminal emulation capabilities, including both character display and keyboard support, are priced at $95.

More information is available from Technical Analysis Corp., 120 W. Wieuca Road N.E., Atlanta, Ga. 30042.

# Relay Price Hike Effective July 1

NEW YORK — VM Personal Computing has announced that it will raise the price of its Relay communications package for the IBM Personal Computer from $89 to $149 effective July 1.

Relay is said to allow simultaneous sending and receiving of files between Personal Computers while printing and editing locally. Relay connects to mainframes and contains a full-screen text editor as well as Help facilities, a spokesman said.

More information is available from VM Personal Computing at 60 E. 42nd St., New York, N.Y. 10165.

# M20 Micro Gets POS System

IRVING, Texas — Docutel/Olivetti Corp. has announced a Point-of-Sale (POS)/Inventory Control System based on the firm's M20 personal computer.

The system is said to feature immediate updating of inventory records as a result of sales, refunds, returns or exchanges. The system includes the M20, cash drawer, PR6200 printer and a special version of the Advanced POS System software from Advanced Data International Corp.

The special version M20 features 160K bytes of internal memory, two 320K-byte double-sided, double-density disk drives and monochrome video display. Electronic spreadsheet, data base management or word processing can be performed on the system when it is not in use for POS, according to a spokesman for the vendor.

The complete system costs $6,095 from the firm at Suite 300, 106 Decker, Irving, Texas 75062.



# Terminal Offers Communications For Voice, Data

ELMSFORD, N.Y. — Scott-Thompson Corp. has announced the Communicator II, a communications terminal capable of both voice and data communications over asynchronous or synchronous lines.

In addition to providing on-line or automatically programmed delayed transmission and reception of text or voice information, the unit can provide access to in-house or remote computer systems.

Additional features of the Communicator II include: a simplified word processor, a memory typewriter with cassette storage, a full-year appointment calendar, a telephone answering machine, a telephone conversation recorder, a dictating machine, an autosend and autoreceive text and voice capability, a directory and autodialer.

The Communicator II can communicate with any Ascii terminal, AT&T Telex or TWX machine, the vendor said.

The unit costs $2,995 from Scott-Thompson at 7 Westchester Plaza, Elmsford, N.Y. 10523.

# Package Handles Transmission

GALENA, Ohio — Database Associates has announced an intersystem data transmission software product said to be a free-standing program package. It runs on IBM 370-compatible host mainframes to provide two-way transmission with any remote system supporting 3780 protocol and data formats.

Datatran reportedly handles any fixed-length logical records from 30 to 4,094 bytes in length. No operator action is required at the IBM host since all transmission activity is initiated by the remote site. Complete transmission monitoring and logging, as well as dynamic allocation of data sets, is provided at the IBM host site, according to a spokesman for the vendor.

Currently implemented with the IBM MVS operating system, Datatran is available under a perpetual license at a cost of $3,500.

Also, a DOS/VSE version is available on request, the vendor said through P.O. Box 398, Galena, Ohio 43921.

## *Supercomputer Development Completed: Denelcor Head*

WASHINGTON, D.C. — In joint hearings before two subcommittees of the House Committee on Science and Technology here, James Hill, president of Denelcor, Inc., said his firm has completed the development of a supercomputer that is 500 times faster than any other currently available supercomputer.

Expected to be available in early 1986, Hill said the system in its high-end configuration is capable of processing 12 billion instructions per second.

Hill attributed the system's processing power to its parallel processing architecture.

Hill told congressmen, who are holding hearings on the strategic and economic importance of maintaining America's dominant position in high-speed systems for scientific applications, that his firm had solved one of the major problems inherent in parallel processing — namely the inability to achieve linear increases in speed and performance as more processors are added to the system.

Hill pointed out that the Denelcor system, called HEP-2, is only about half as fast as systems the Japanese claim they will produce by 1989. However, he added, as HEP-2's architecture evolves, it will surpass the Japanese systems' processing abilities.

"While some observers have dismissed the Japanese super-speed computer project as unrealistic, we believe that development of such a system is eminently feasible, particularly since we understand the Japanese plan envisions the creation of a parallel-processing architecture we have been developing for the past seven years," Hill said.

Primary applications for the machine include maintenance of national defense systems, ballistic missile trajectories and nuclear weapons development.

The system will also be aimed at more commercial applications such as petroleum and mineral discovery.

# Joint Development Effort Produces Multiprocessor Programmed in Ada

ROCKVILLE, Md. — In a joint development effort, Intellimac, Inc. and Westinghouse Electric Corp. announced they have produced the first multiprocessor system programmed in Ada.

By employing a new technique called Closely Coupled Asynchronous Parallel Processing, officials from both companies claim the In/7000K system has four times the speed and performance of a single processor system.

The Motorola, Inc. 68000-based system contains four processors each with 256K bytes of memory, a 512K-byte global memory, eight RS-232 intelligent serial interfaces and a 16M-byte Winchester disk with 8M bytes fixed and 8M bytes removable.

The system is compatible with Telesoft, Inc.'s ROS operating system and its Ada compiler. Intellimac developed the system's kernel software, which controls interprocessor communications and I/O, a spokesman said.

"Each of the four CPUs has a quarter of a megabyte of memory on board, and it can have up to 1M byte of global memory on the bus. Each CPU is booting independently, pulling information from different segments of the disk," said Ralph Craft, vice-president of operations and marketing for Intellimac.

### 'Poetic License'

Explaining how the In/7000K's parallel processing architecture is different from the parallel architectures of other recently introduced systems, Craft said, "Those companies that have come up with parallel implementations are exercising a little poetic license, we feel. Their processors are often called on to do specific functions like I/O.

"With this system, you are allowed to use all four CPUs for main program processing. If the user has a program that executes in T time, he can allocate tasks over those four processors and cut his time down to T over N," Craft explained.

Craft claims that a parallel processing system like the In/7000K is the key to bridging the gap between fourth-generation and fifth-generation computers. "Basically what we are showing here is parallel processing that will someday be on a chip. This has tremendous possibilities for applications like artificial intelligence and robotics work," Craft asserted.

Craft said Intellimac has experimented with Ada in-house for semantic processing and natural language translation applications. "It [Ada] is an object-oriented language, and artificial intelligence systems are characterized by the requirement to process a lot of data in a very short period of time. The multitasking intrinsics of Ada allow you to apply those tasks across a whole slew of processors contained in the same box," he noted.

Westinghouse is developing

*(Continued on Page 72)*

*Feature Virtual Memory*

# Micros Target Multiuser Networks

CARMEL, Ind. — Software Services Corp. has announced the Network Master Series I and II, stand-alone virtual memory microcomputers for use in multitasking, multiuser networks.

The Series I includes two 5¼-in. floppy disk drives, 64K bytes of random-access memory, a 12-in. nonglare CRT terminal, a detachable keyboard, STD bus compatibility and support for a variety of off-the-shelf support cards. It comes with Digital Research, Inc.'s CP/M and costs $5,500.

The Series II, which includes a single 5¼-in. floppy disk drive, a 20M-byte Winchester disk drive, STD bus compatibility and a card cage to accommodate I/O-intensive systems, costs $8,500.

A keyboard with an 8K-byte by 8K-byte programmable read-only memory programmer is available for engineering applications. Software Services' NMC operating system is available to accommodate virtual memory.

Software Services is located in Suite 6, 833 W. Main St., Carmel, Ind. 46032.

Software Services Corp.'a Network Master Series

Actual size: 5½" x 3½"

Quantity ea. U.S. Patent 4,
UNIX is a trademark of Bell L

# No other micro can stand up to the Micro/PDP-11.

# Dynamic Simulation Unit Targets Gould Superminis

WEST LONG BRANCH, N.J. — Electronic Associates, Inc. has announced a dynamic systems simulation unit for Concept 32 superminicomputers from Gould, Inc.'s SEL Computer Systems Division.

Dubbed Simstar, the automatic scientific processor operates at the equivalent of 200 million instructions per second. It uses a continuous computing methodology that avoids the problems normally associated with numerical solution of stiff differential equations, the vendor said.

Simstar also simulates systems with natural frequencies of less than one cycle/sec through the kilohertz range.

A basic Simstar unit has a single Parallel Simulation Processor (PSP) and Digital Arithmetic Processor (DAP). The PSP is composed of a parallel logic unit and a parallel math unit. Sequential digital computing is provided by the DAP, which incorporates a 32-bit CPU.

With an optional floating-point accelerator, the DAP is approximately equivalent to the processing power offered by a Digital Equipment Corp. VAX-11/780, Gould claimed.

Fully automatic and programmed in Fortran, Simstar's price begins at $150,000. Electronic Associates is located at 185 Monmouth Pkwy., West Long Branch, N.J. 07764.

# *Processor Out For DEC LSI-11*

HUNTINGTON BEACH, Calif. — Ranyan Computer Enhancement Systems has introduced a single-board Motorola, Inc 68000-based processor intended for enhancement of Digital Equipment Corp. LSI-11 microcomputers.

The Model SBP-68Q uses a high-speed memory bus and multiple memory management units. The 16-bit processor is hardware-compatible with all Q-bus peripherals, memory and controllers. It provides 32-bit data and address registers, as well as 56 instruction types for operations on five main data types.

The processor costs $2,880 from Ranyan, 15239 Springdale St., Huntington Beach, Calif. 92649.

# Gerber Plotter Gains Link To Station

HARTFORD, Conn. — The Gerber Scientific Instrument Co. has announced an optional check plotter along with an interface and software package that links the plotter to the company's Autoprep 5000 Dataprep station.

The Autocheck package reportedly allows the operator to create layouts for jobs and produce immediately a pen-on-paper proof, which indicates plate-imposed flat layout with trims, bleeds, margins and flat identification.

The Autocheck plotter is connected on-line to the Dataprep station via an RS-232 interface. It is available in 24-in. or 36-in. widths.

The 24-in. plotter is priced at $19,140; the 36-in. model costs $25,375. The software for the plotter costs $2,560, and the interface is priced at $8,550. More information is available from Gerber Scientific, which can be reached through Box 305, Hartford, Conn. 06101.

# Printer Interface Gets Updated

WESTLAKE VILLAGE, Calif. — Practical Peripherals, Inc. has developed serial and parallel versions of its Microbuffer II printer interface for Apple Computer, Inc.'s Apple II and Franklin Computer Corp.'s Apple-compatible systems.

The unit reportedly is capable of receiving, storing and handling information from the Apple II, as well as providing text formatting and graphics dump routines.

Up to 32K bytes of on-board random-access memory lets the unit receive data from the Apple II.

Microbuffer II operates with all software running under Basic, Pascal or Digital Research, Inc.'s CP/M.

The unit costs $259 for a 16K-byte version and $299 for a 32K-byte version from Practical Peripherals at 31245 La Baya Drive, Westlake Village, Calif. 91362.

# Joint Effort Produces System

*(Continued from Page 69)*

an Ada compiler for the MIL-STD-1750A computer that is scheduled to be delivered to the government sometime in the fall, a spokesman said.

Also in the fall, Craft said, Intellimac will be adding a 12-MHz version of the 68000 chip to the system that will allow it to process information 75% faster than Digital Equipment Corp.'s VAX-11/780.

The bare-bones version of the system is priced in the mid-$20,000 range and can go up to just under $70,000 for a three-CPU configuration that stores up to 200M bytes on disk, according to a spokesman from Intellimac.

Intellimac is located at 6001 Montrose Road, Sixth Floor, Rockville, Md. 20852.

*Fits 788K-Byte Disk*

# Micro Features Dual Disk Drives

SOLANA BEACH, Calif. — Non-Linear Systems, Inc. has announced a portable computer that contains dual disk drives and accommodates a 788K-byte disk.

At the same time, the company announced it has cut the price of its 64K-byte Kaypro II unit.

The new Kaypro 4 is designed for use with double-sided, double-density disks with 394K-byte memory for a total of 788K bytes for the unit's two disk drives. The unit employs Zilog, Inc.'s Z-80 microprocessor and is said to feature 72 keys including 20 programmable keys and a 14-key numeric keyboard.

The Kaypro 4 features a 9-in. green-phosphor screen with 80 columns across and 24 lines deep. The unit costs $1,995. The Kaypro II's price has been reduced to $1,595, a spokesman said from 533 Stevens Ave., Solana Beach, Calif. 92075.

# Scaldstar Station Offers Computer-Aided System

SUNNYVALE, Calif. — Valid Logic Systems, Inc. has announced the Scaldstar design station, a computer-aided engineering system.

Scaldstar, according to the company, is the first commercially available computer-aided engineering system that allows an engineer to create a logic design and continue the design process through to the creation of very large-scale integration (VLSI) circuits. The design station includes two high-resolution graphics CRT displays: a color display for presenting the design topologically and a monochrome display for use in logic design, the vendor said.

The unit combines the firm's Scald schematic entry and validation software with VLSI layout programs. This, the vendor said, can reduce the time required for VLSI chip design, while making certain that a design will meet functional and timing specifications all the way to the mask layout stage.

Scaldstar includes two graphics editors. The Scald Graphic Editor is used for production of circuit schematics for simulation, verification and documentation. The Valid IC Editor is used to create a cell layout, the vendor said.

Scaldstar is compatible with Bell Laboratories, Inc. Unix operating system, which allows the unit to use many scientific and engineering programs. A typical Scaldstar system costs about $70,000, the vendor said from 650 N. Mary Ave., Sunnyvale, Calif. 94086.

# *Menu Management Based On IBM Personal Computer*

ITHACA, N.Y. — The Cbord Group, Inc. has announced a turnkey Menu Management System based on the IBM Personal Computer.

The system includes basic recipe precosting and system maintenance; interactive menu planning; menu costing; production, purchasing and ordering; cash operations management and pricing, and physical inventory extension.

Standard hardware includes a 512K-byte Personal Computer with dual 320K-byte floppy disk drive, a 20M-byte Winchester disk drive with a streamer tape cartridge backup, a 200 char./sec matrix printer and an operating system.

The supplier will also include Visicorp's Visicalc spreadsheet and Information Unlimited Software, Inc.'s E-Z Writer word processing software.

Base price for the system is $39,000 from Cbord at 110 N. Meadow St., Ithaca, N.Y. 14850.

# Solid Modeling System Produces Micro Graphics

BERKELEY, Calif. — Cubic Systems, Inc. has announced a three-dimensional solid modeling system said to produce mainframe quality graphics on a microcomputer.

The CS-5 operates as a terminal or a stand-alone graphics system, according to a vendor spokesman, and features two 512 by 512 by 16 frame buffers with 4,096 colors that can be displayed from a palette of 16.8 million colors.

The CS-5 also features three-dimensional modeling through the applications of orthogonal or perspective projections, clipping, shaded surfaces with smooth shading and hidden line or surface removal.

The introductory price of the CS-5 starts at under $9,000. Further information is available from the vendor at 2472 Ellsworth St., Berkeley, Calif. 94704.

# MLSI-RM11 Controller Emulates DEC Drives

ORANGE, Calif. — MDB Systems, Inc. has introduced a disk controller said to configure automatically any one of eight storage module drives to Digital Equipment Corp.'s LSI-11 systems without software modifications.

Emulating DEC's RM02, RM03 and RK06/RK07 drives, the MDB MLSI-RM11 controller is driver and diagnostic transparent to all DEC operating systems without requiring modification, an MDB spokesman said.

The controller features 16-, 18-, 22-bit addressing, four-level priority and interrupt vectoring, he added. Its noninterleaving direct-memory access throttle features reportedly allow transfer bursts from one to 16 words.

Priced at $2,800, the controller is available from MDB Systems at 1995 N. Batavia St., Orange, Calif. 92665.

# Bits & Pieces

## Xidex Targets End-User Mart With Line of Floppy Disks

SUNNYVALE, Calif. — Xidex Corp. is now offering its formerly OEM-oriented line of premium floppy disks to the end-user market.

The Precision Flexible Disk line has been designed around the 96 track/in., 5¼-in. flexible disk technology. The product line is said to be manufactured with a proprietary coating formula for magnetic signal strength approximately 20% greater than the industry average.

Available in packages of two or 10 to end users, the line comprises six basic products ranging in price from $4.50 to $7.50 per disk. Xidex is located at 305 Soquel Way, Sunnyvale, Calif. 94086.

## Laser Bar Code Scanner Out, Joins Functions in Single Unit

BELLMAWR, N.J. — Metrologic Instruments, Inc. has introduced a laser bar code scanner said to include scanning, decoding and communications in a single unit.

The MS190 Scanhandler laser bar code scanning system reportedly includes the optics and electronics necessary for noncontact scanning in a 15-oz hand-held device, providing 150 scans per second and real-time decoding.

The MS190's design reportedly incorporates both RS-232C and 5V wand emulator interfaces. Through the standard RS-232C interface, the MS190 can communicate with most portable and desktop terminals, a vendor spokesman said.

The Scanhandler is priced at $1,800 from Metrologic, 143 Harding Ave., Bellmawr, N.J. 08031.

## Wesper Microsystems Offers Buffer for Epson Printers

TUSTIN, Calif. — Wesper Microsystems, a subsidiary of Wespercorp, has announced a 64K-byte buffer for Epson America, Inc. MX or FX serial printers. The buffer allows a processor to dump its print data nonstop into the buffer and proceed to the next task.

Called the Wizard EBI-Serial, the buffer was designed to complement Wesper Microsystems recently introduced Epson parallel buffer. It includes a transmission rate selection switch for setting the transmission rate between 50- and 9,600 bit/sec. The device can be installed into the existing socket inside the Epson MX or FX printer, the vendor said.

The 16K-byte version of the Wizard EBI-Serial costs $216, the vendor said from 14321 New Myford Road, Tustin, Calif. 92680.

## Transient Protection System Guards Against High Voltage

PROVIDENCE, R.I. — AKI Microsystems, a division of Aeolian Kinetics, Inc., has announced the Modular Transient Protection System. The device attaches to I/O and data lines that link computers, programmable controllers and data acquisition systems to sensors, instruments, modems and peripherals.

The unit protects from high voltage transients that are electrostatically induced in wires by lightning, static discharge or load switching. It is available with working voltages from 5V to 200V.

Transient Protection modules cost $67 each with quantity and OEM discounts available. AKI Microsystems can be reached through P.O. Box 100, Providence, R.I. 02901.

## Digital Video Mux Board Fits Apple II, II+ Micros

ELK GROVE, Ill. — Amdek Corp. has announced the DVM-II, a digital video multiplexer board for Apple Computer, Inc. Apple II and Apple II+ microcomputers.

The DVM-II features 15 low-resolution colors (16 colors with an analog monitor) and two additional high-resolution modes: all white or three colors with pure white. A color gun is selectable for all green or other colored text, the vendor said.

The DVM-II is expansion-slot-independent and can provide red, green and blue output via the Apple video output. The board will provide 80-col. capabilities in high-resolution colors via any RS-170 output 80-col card. The unit includes two connector cables and one video monitor connector cable. The DVM-11 costs $199, Amdek said from 2201 Lively Blvd., Elk Grove, Ill. 60007.

Santa Barbara's Executive System

## Executive Terminal Boasts Windowing, Voice Control

SANTA BARBARA, Calif. — Santa Barbara Development Laboratories, Inc. has introduced a "keyboardless" color executive terminal said to feature touch-screen data access, windowing and voice control of data entry and editing functions.

Users interact with the system by touching one of the screen images. The user is then prompted through the various routines associated with the symbols. Response time is less than one second, a vendor spokesman said.

Full-color pictures of recognizable objects such as a calculator, a filing cabinet or a telephone are placed on the screen, and buttons, switches and knobs work the same way on the screen as they do with the real objects. The calculator on the screen works like a desktop calculator with working keys and a display screen.

Voice is used to enter data, change data and communicate information to other users of the system. Communications capabilities include a telephone with the attached handset and electronic mail. Video conference capability is planned for future versions. Information presentation capabilities include file storage of text, data, drawing and charts.

The system uses multiple processors, 1M byte of main memory and an 80M-byte data base to support information handling, voice processing and telephone operation.

The average price of the workstation is $25,000, available from Santa Barbara Development Laboratories, 224 Anacapa St., Santa Barbara, Calif. 93101.

## Intecom's IBX Gets Voice Messaging

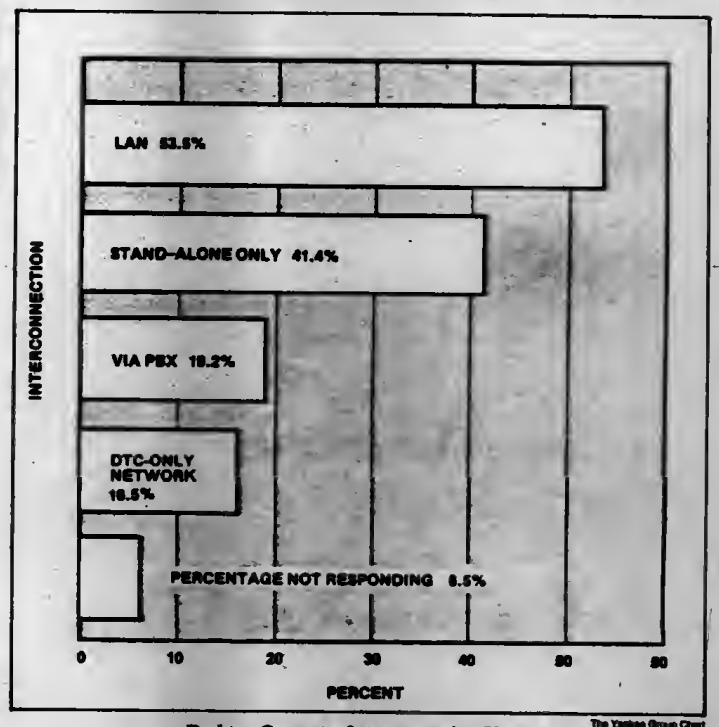
ALLEN, Texas — Intecom, Inc. has announced the integration of an open architecture voice message system for all models of its Integrated Business Exchange (IBX) voice/data communications system.

Intemail reportedly requires no dialing by users, but utilizes a function key on the firm's Integrated Terminal Equipment electronic instrument for reviewing or replying to messages.

In addition to voice store-and-forward messaging capabilities, Intemail is said to include automatic call answering, automatic voice message desk, message waiting indication and multiple levels of message review.

Prices begin at approximately $100,000 for an eight-port, 16-hour voice storage system, a spokeswoman said. More information is available from Intecom at 601 Intecom Drive, Allen, Texas 75002.

# Micros Not Being Used To Full Capacity: Studies




Desktop Computer Interconnection Plan

By Jim Bartimo
CW Staff

BOSTON — More than two-thirds of workers in the office, in administration and in the corporate suite use their desktop computers less than one-half hour per day, according to two studies recently released by The Yankee Group, a consulting firm based here.

This lack of use can be blamed on those in charge of acquiring the hardware, the studies found. "The people making the decisions in establishing purchase criteria have very little hands-on experience," according to Yankee Group consultant Kate Cogswell-Carr, who helped conduct the studies.

Corporations are recognizing the need for a purchase policy, but those appointed to create the guidelines are not aware of what is needed in specific departments. Desktop computers that were once "brought in the back door" had a higher usage because the individual departments made the purchase decisions and knew best what they needed, Cogswell-Carr said.

The first survey looked at 100 Fortune 1,000 companies and the second covered a broader number of companies in manufacturing, insurance, banking, finance retail, utilities, transportation and other industries. The results were drawn from companies with 1981 revenues between $50 million and $50 billion, the studies reported.

The studies also found that 26% of the respondents currently have no desktop computers, but only 3.9% believed that they would not have one on-site by 1985.

The expected high volume of these computers has lead to the creation of these policymaking groups. "The people that we talk to are telling us that all these computers are going to have to be tied together," Cogswell-Carr said, and they can only be tied together if there is an organized corporate purchase plan.

The studies also showed that 53.5% of the respondents planned to connect their desktop computers in a local-area network with a minicomputer or mainframe, and 19.2% planned to connect them via a private branch exchange computerized telephone switch. A smaller number — 16.5% — predicted they would set up a network

*(Continued on Page 76)*

## Enhancements Out For Exxon 500

STAMFORD, Conn. — Exxon Office Systems Co. has introduced two communications enhancements to its Exxon 500 Series Information Processor said to allow the processor to emulate the IBM 3278 Model 2 terminal and provide increased asynchronous communications capability.

Exxon's 3270 Emulation software allows 3270 emulations through a variety of third-party protocol converters that support either the IBM Binary Synchronous Communications protocol or Systems Network Architecture. The converter can support up to seven workstations, an Exxon spokesman said.

A second enhancement, the Async II, is a communications package that can convert both incoming and outgoing code sets for specific vendors such as IBM, Wang Laboratories, Inc. and NBI, Inc. This package gives the Series 500 asynchronous communications capability.

Exxon's 3270 Emulation software costs $300; single-port configuration protocol converters cost $3,100. Asynch II is available for $300. More information can be obtained from Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

# 'Spectra-Text' Offers Graphics

NORCROSS, Ga. — Graphics software said to prepare charts, graphs and other presentation materials for business, government and education has been introduced by Executive Presentation Systems Corp.

Spectra-Text software reportedly features a library feature and a cut-and-paste capability. The package also allows merging of address lists with form letters and the insertion of information specific to the person addressed.

The system will drive NEC Information Systems, Inc. Spinwriters and Computers International, Inc. Daisywriters printers. Spectra-Text costs $550 from the firm at 5854A Peachtree Corners E., Norcross, Ga. 30092.

# *VMX Repackages Exchange System*

ANAHEIM, Calif. — VMX, Inc. has announced a repackaging of its Voice Message Exchange system.

The VMX/III now consists of VMX software with 16 to 64 ports. Capable of handling from 400 to 8,000 users, the voice storage capacity reportedly ranges from 50 to 170 hours of recorded voice, according to a spokesman for VMX.

Based on maximum port configuration, the VMX/III series costs $8,203.

More information is available from VMX, located at 1241 Columbia Drive, Richardson, Texas 75081.

# Rapicom Unveils Interface For Computer, Digital Nets

FAIRFIELD, N.J. — Rapicom, Inc. has introduced a facsimile-applied intelligent digital interface for computer and digital communications networks.

The intelligent I digital interface, when coupled with the Rapicom 3300 or Rapicom 3100 desktop digital facsimile transceivers, is said to provide an applications-oriented facsimile terminal that can be configured for connection to an end-user's computer system or digital communications network.

The operator's control panel includes an 80-char., two-line LCD display, keypad, function keys and LED indicators. Function keys are double-action switches that include secure/nonsecure selection, menu mode, menu scroll, data enter, communications pause and clear display keys, according to a spokesman for the vendor.

Available in September, Intelligent 1 ranges in price from $1,000 to $1,500. Additional information is available from Rapicom, located at 7 Kingsbridge Road, Fairfield, N.J. 07006.

# Magna SL Gets Enhancement From A.B. Dick

CHICAGO — A.B. Dick Co. has announced Plus-4, an enhancement to the firm's Magna SL word processing system that allows a customer to attach a variety of additional devices to the unit.

Up to four full-page CRT workstations, three 55 char./sec letter-quality printers and three archive disk drives offering a total of 2.4 million characters of on-line storage can be attached via the Plus-4 option. Furthermore, optical character readers can be attached in place of printers, the vendor said.

In addition, Plus-4 offers 128K bytes of memory to support future enhancements to the system, such as background processing, the vendor said.

Said to be a user-friendly, long document assembly unit with full-page display capabilities, the Magna SL includes standard features such as merge, sort/select, math and keystroke capture.

The Plus-4 option costs $1,995. A fourth Magna SL workstation costs $3,995, the vendor said.

A.B. Dick is located at 5700 W. Touhy Ave., Chicago, Ill. 60648.

# Studies Reveal Micro Patterns

*(Continued from Page 75)*

connecting only the desktop computers to each other (see chart on Page 75).

A surprisingly high number of respondents — 41.4% — planned to keep the desktop computers as stand-alone systems.

"We feel that the reason for this high number is that it represents the number of desktop computers that will be displaced," Cogswell-Carr said.

"Just like you have displaced typewriters now, you'll eventually have displaced electronic typewriters and personal computers. They will be outside the network, used for stand-alone applications," according to Cogswell-Carr.

The two studies are volumes one and two of a four-volume set that is titled "Pulse Desktop Computing Study."

The studies are available for $8,500 from The Yankee Group, 89 Broad St., 14th Floor, Boston, Mass. 02110.

*But Worst Not Over Yet*

# Return to Basics Could Save TI: Analysts

By Patricia Keefe
CW Staff

Although Texas Instruments, Inc. may now find itself between a rock and a hard place in the consumer electronics market, industry analysts see a more stable period ahead for the beleaguered firm if it sticks to what it knows best — semiconductors and industrial electronics, which comprise the bulk of TI's revenues.

However, there is no reason to believe the worst of the massive scrambling to unload TI stock is over yet, Tad LaFountain, an analyst with Shearson/American Express in New York, said last week. The dumping of TI stock was triggered by the firm's recent announcement that it expects to lose $100 million in its second quarter, losses directly attributable to its consumer electronics offerings.

LaFountain agreed with speculation that few of the large institutions that retain large holdings of TI stock will be anxious to face their clients at annual meetings June 30 with a fat TI stock portfolio. As a result, TI's stock, which had begun to rebound from a dramatic $51 per share drop in price two weeks ago ($158 to $107 per share), may be headed down lower yet, he said. The stock had inched back up to $116 last week.

And if TI adopts a fiscally defensive position, "it could produce other shocks in their earning power," warns Adam Cuhney, vice-president for Salomon Brothers, Inc. in New York.

TI has reduced production plans for 1983 for both home computer hardware and software. These revised plans will require "a significant charge" in the second quarter for inventory reevaluation and write-

*(Continued on Page 80)*

## *TI Plunge Causes Speculation On Future of Home Computers*

By Patricia Keefe
CW Staff

While the $1.2 billion nosedive of Texas Instruments, Inc. on Wall Street two weeks ago was termed by one analyst, "TI's exaggerated response to a market problem," the company's recent projection of a minimum $100 million loss in its second quarter has shaken the stocks of some competitors and stimulated discussion about the future of home computers (see related story).

Almost universally, industry sources agreed with predictions of increased home computer sales in 1983. But there are some signs of worry. Tad LaFountain, an analyst from Shearson/American Express, predicted that Timex Corp., which markets the Sinclair 1000, "will be out of the market in six to eight months. They are losing so much money now, I wouldn't be surprised if they just folded up their tent and went away," he said.

In a market driven by price and stifled by backlogged inventories at the retail level, vendors may find that the key to survival lies in the increased utility and upgradability of their products. LaFountain observed, "there are a whole lot of people like myself who use personal computers and who are not willing to go down to the level of a home computer."

Other retail store owners and

*(Continued on Page 80)*

## *Minority Equity Pact Seen as Vanguard Of Trend For Mainframers*

By Bill Laberis
CW Staff

IBM's minority equity positions in Rolm Corp. and Intel Corp. are at the vanguard of a trend that other mainframers will likely follow, a consensus of industry analysts has indicated.

This trend will be fueled primarily by the increasingly steep research and manufacturing costs associated with new product offerings and the increasingly shorter life cycles of these offerings.

Further, analysts said, the political and financial environment over the next several years will favor large companies assuming minority equity positions in smaller firms, with the equity position providing both easy access to and a quick exit from the management of other companies.

According to one analyst, IBM is leading the trend because "it is perhaps a bit more clever and a lot richer than its competitors." Earlier this month IBM announced its intent to purchase 15% of Rolm [CW, June 20] and last year bought 12% of Intel Corp. In both cases, IBM reserved the right to purchase up to 30% of each company, while assuring the placement of IBM people on the boards of each.

Also this month Sperry Corp. acquired 15% of Trilogy Corp. [CW, June 13], the Cupertino, Calif.-based start-up headed by Gene Amdahl that will produce high-end manaframes to compete with IBM's top-of-the-line offerings. France's CII-Honeywell Bull also holds a 3% stake in Trilogy.

Unlike joint research and development pacts, of which there are literally dozens in the computer industry, the minority equity deals imply a much cozier relationship between two companies.

And, as IBM has shown, the equity relationships yield potentially significant financial rewards. IBM has earned a paper profit of over $100 million since investing $250 million in Intel last December. And the price of the 3.8 million shares of Rolm stock, which IBM has contracted to pur-

*(Continued on Page 78)*

# Minority Equity Pacts Seen as Future Trend

(Continued from Page 77)

chase for $59 per share, had jumped to $72 per share early last week, yielding a nearly $50 million paper profit before the deal is consummated.

But it is the desire to move into new or expanded product markets, coupled with limited capital and technological resources, that will cause IBM and other mainframers to enter into minority equity relationships on a continuing basis, analysts said.

Why an equity position instead of an outright purchase of a smaller company?

"A full purchase could destroy the thing you want most, and that's the management of the company you're interested in," said L. Duane Kirkpatrick, a principal in the San Francisco, Calif., consulting and investment banking firm of Woodman, Kirkpatrick and Gilbreath. "Sometimes in a complete buy-out, existing management chooses to walk . . . You absolutely don't want a mass exodus of top personnel."

Kirkpatrick said the state-of-the-art in the computer industry is highlighting a blurring of distinctions between hardware, communications and software products. An equity stake can assure a mainframer like IBM of a continuous supply of key system components it either doesn't produce, as in the case of Rolm's private branch exchange products, or which it doesn't produce enough of, as in the case of Intel's microprocessors, Kirkpatrick indicated.

Asked what types of companies might make attractive equity partners for the mainframers, Kirkpatrick listed local-area network companies and makers of back-end data base machines as possible candidates.

Bernie Goldstein, president of Broadview Associates of Fort Lee, N.J., called the equity partnership "a relatively unusual happening . . . that we'll probably see a lot more of."

Goldstein said the pro-business climate in Washington, D.C., has taken some of the risk out of such deals, particularly for IBM, which lived in the shadow of a federal antitrust suit for 10 years.

That other companies will follow IBM's lead "will be almost assured by the level of success IBM has with its two deals," Goldstein said. He speculated that IBM might look at similar deals involving communications vendors.

Harry Edelson, vice-president of the First Boston Corp. of New York, said the recently hatched equity deals are proof that "you have to be real fast on your feet, even if you're very big." Edelson added that equity partnerships are a good way to conserve capital, such as the expense of building manufacturing facilities for new product lines.

"Perhaps the competition with the Japanese companies is something of a factor here, too, but the roots of this trend are in the increasing rate of technological obsolescence and the high costs of maintaining a competitive edge," Edelson said.

# Adapso Proposes IBM Changes

ARLINGTON, Va. — The Association of Data Processing Service Organizations (Adapso) has sent a position paper to executives at IBM proposing modifications to two IBM policies.

One proposal would allow independent software companies to continue to obtain source code for IBM systems software; another would have IBM unbundle the 14 components of the Small System Executive/Use (SSX) operating system for its 4321, 4331 and 4341 systems.

IBM announced on Feb. 8 that it would restrict or eliminate the availability of source code for its software products. Adapso is calling for IBM to make available source code in the form of microfiche and associated program logic documentation to independent systems software companies with a "need to know."

In November 1981, IBM announced the bundling of 14 previously available products and renamed it SSX. Adapso asked that any software product offered separately by IBM continue to be offered separately.

Adapso also urged the U.S. Senate Committee on Banking, Housing and Urban Affairs to create structural separation between institutions and their marketing of Adapso services in any rewrite of the Bank Holding Company Act. In testimony before the Senate committee recently, Adapso maintained that any depository institution deregulation must separate banking from data processing services sold to the public to protect depositors' funds from competitive activities.

Adapso said the structural separation would not preclude depository institutions from entering the Adapso market, nor keep them from using the technology for internal operations. It would, however, force them to compete by offering Adapso services on the same basis as the independent computer services firms without the ability to tie their depository services to Adapso or cross-subsidize their Adapso business with resources derived from depository operations.

*Longer Life Span, Workstation Growth*

# IBMers Suggest Some Local Net Ingredients

By Bill Laberis
CW Staff

RALEIGH, N.C. — Although it has announced no local-area network products to date, IBM has "a good idea of what should be included" in any product offerings, a group of security analysts were told recently here.

Speaking to the biannual meeting of the Boston Society of Security Analysts, Paul Lindfors, manager of telecommunications systems strategy, said the ideal local-area network should have a 15- to 30-year life span and be targeted at accommodating workstation growth.

Hinting further at the local-area network that IBM will imminently announce, Lindfors said the ideal system should allow the user to grow from a network using copper wire for data transmission to one using fiber optics.

### Nonexclusive Architecture

And perhaps most importantly, IBM would like to "create a [local-area network] architecture which is nonexclusive ... an open system" that will allow for the attachment of other vendors' products rather than a closed or proprietary system.

In light of IBM's recently stated intention to acquire 15% of Rolm Corp., a major private branch exchange (PBX) maker [CW, June 20], Lindfors compared PBX and local-area network technologies and how the two product lines fit into IBM's overall strategies.

Digital PBX products — even the more advanced types that feature both voice and data transmission — will not be capable of meeting the high-speed data communications needs of some future office systems, Lindfors said. The local-area network is the quintessential tool for delivery of high-speed data communications, Lindfors added.

Thus, "there is the likelihood that both PBX and local-area network technology" will exist side-by-side in IBM's product strategy, he indicated.

John Opel, IBM chairman and chief executive officer, also addressed the intended minority equity deal with Rolm, suggesting that it was fostered in part by IBM's quest for certain communications standards. The deal, Opel said, might enable IBM to "accelerate some design decisions" in the PBX area while promoting a drive toward a "de facto" standard regarding interconnectability of certain communications equipment.

The Rolm deal meant the demise of a joint product development agreement IBM struck with Mitel Corp. last summer to harmonize some of Mitel's PBX offerings with IBM's office automation products. That deal was reportedly mired in the development of communications software, although Opel denied that IBM's Rolm deal was a matter of choosing one vendor while casting off the other.

In other matters addressed at the meeting, Opel and Allen Krowe, IBM's chief financial officer, said the company's performance in 1983 will rival or exceed the record-setting results of 1982, during which profits leapt 22%. Opel indicated that the acquisition of minority holdings in Rolm and, late last year, in Intel Corp. are the kinds of transactions IBM must hatch to maintain multi-billion dollar annual growth, saying, "You can't do it all by yourself."

In particular, Opel said sales of the company's 3080 series of high-end processors are brisk, as is the demand for its storage devices. Meanwhile, demand for the company's Personal Computer line "continues to exceed our forecasts," Opel said.

Demand softness in the company's mid-range, 4300 series processors is more a product of a slack international economy than an inherent problem with the computers, Opel said. "I do not believe it is a bad design," he added, predicting that a general economic recovery will foster healthier 4300 series sales.

Finally, an IBM official killed speculation that IBM's Japanese subsidiary would join the Japanese government-sponsored fifth-generation computer project. Ralph Pfeiffer, vice-president of Far East operations, said it is "not in [IBM Japan Ltd.'s] business interest to cooperate with competitors in exchanges of proprietary information."

## Mergers & Acquisitions

**Microtech Business Systems**, Costa Mesa, Calif., and **Star Computer Group**, Sharon, Pa., have reached an agreement in principle to merge the two companies into Star Technologies, Inc. Terms of the agreement were not disclosed.

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**Altergo Products, Inc.** of Woburn, Mass., has been acquired by **Thorn-EMI (USA), Inc.** Altergo will operate autonomously.

# Return to Basics Could Save TI, Analysts Say

(Continued from Page 77)

offs, "aggressive cost-reduction measures, development of new hardware, vigorous software expansion and emphasis on merchandising and dealer support" for the approximately 20,000 retail outlets worldwide now carrying an excess inventory of 99/4A home computers, software and peripherals, Cuhney said. Should TI decide to introduce its latest planned offering, the 99/8, now on temporary hold, it will "suggest that [TI's] commitment to the home market is still real and that the company is still at risk," Cuhney predicted.

On the other hand, investors "would be enthusiastic" about the company if they could get "some sign [from TI] that would signify a de-emphasis on consumer products, as they are underperforming here," Cuhney said.

Salomon Brothers has not recommended TI stock since January 1981 on the premise that TI "has no historic ability to handle, manage or profit from consumer electronics. I feel pretty good. I feel we've been vindicated in not giving them the benefit of the doubt, and it's tough to be vindicated in a bull market," Cuhney added.

Despite the cancellation of the 99/2, the closing of the last TI-owned retail outlet, a two-week shutdown of TI's Consumer Group planned for the first half of July and speculation about possible layoffs, Shearson's LaFountain said he does not believe TI can afford to exit the home computer market. He predicted as much as 15% of TI's semiconductor production goes into its home computer operations. "If they decide to cut their losses and leave, they can forget 15% of their semi production, which could have a negative impact on their semi profits," he said.

# TI Plunge Raises Questions

(Continued from Page 77)

analysts have suggested that more comprehensive software offering increased functionality for more serious needs will stimulate sales.

These attitudes could result in a merger of the personal computer/small business computer market with the home computer market, believes John Geraghty of Dean Witter Reynolds of New York. "Companies want more stable sales than are possible in the games market," he said, adding that TI might make some money if it concentrates on educational software.

Increased sales in the home computer market do not necessarily lead to increased profits. If, as in TI's case, a firm has cut prices near or below the profit margin on its hardware, it does not matter how many units it sells. If it can not move its software, it will not make any money.

TI has been unable to move either its hardware or its software, according to analysts. According to LaFountain, "TI has relatively old products that have lost their price/performance attractiveness" to Commodore International, Ltd.'s "grown-up" offerings. He said further that TI has a basic inabllity to market its offerings.

In order to get back into the market, some analysts recommended that TI limit its exposure throughout the market, cut production costs, start discounting to move inventory at the retail level and cut the price of software. LaFountain suggested that sales of the 99/8, the next generation of TI's 99/4A, scheduled to be introduced before Christmas, "might stem the tide."



# CCI Files Plan For Bankruptcy

TORRANCE, Calif. — Computer Communications, Inc. (CCI) has announced that an independent Plan of Reorganization has been filed with the U.S. Bankruptcy Court by the investment firm of Stires and Co.

At a hearing earlier this month, the court ruled that the competitive Stires plan and accompanying disclosure statement be forwarded to creditors and shareholders for approval. The plan contemplates the underwriting and sale of about 5.6 million new shares of CCI stock for about $10 million net to the company. Of this amount, $6.4 million will be secured via a public offering. Unsecured creditors would be given the option to be paid in cash or stock.

Another plan, announced in March, calls for reorganization with Data-Design Laboratories, which would acquire 80% ownership of CCI through the purchase of about 20 million new shares of CCI stock for about $7 million.

CCI has urged its creditors and stockholders to accept both the Data-Design and the Stires plan, while recommending that creditors and stockholders express a preference for the Data-Design plan "because the company is confident that [Data-Design] has the financial strength to fulfill its obligations to fund the plan and has more than adequate resources to provide ongoing working capital to the company," CCI said.

# Georgia Consortium To Boost High Tech

ATLANTA — Georgia Gov. Joe Frank Harris has announced the creation of the $30 million Georgia Research Consortium to boost the state's high-technology research and development fortunes.

According to the governor's office, the consortium will link and coordinate research and high-technology projects of public and private colleges and universities in cooperative ventures with business and industry.

Although the consortium had been planned for several months, its finalization was accelerated by this city's bid to become the home of Microelectronics and Computer Technology Corp., which last month chose Austin, Texas, as its base of operations.

On behalf of the state, Harris has committed $15 million over the next five years in support of the consortium, while the Atlanta area business community has committed a like amount, still to be raised.

The consortium's prime objective will be to identify high-technology industrial growth opportunities and to provide financial support to establish what Harris called "centers of excellence" in research universities across the state. The consortium will provide overall guidance to the research activities needed to build a high-technology base in the state.

Research efforts and cooperative ventures with private business and industry will be coordinated by the Research Consortium Policy Committee, composed of four representatives from Georgia universities and four industry leaders.



# Pentagon Names Head For Darpa

PALO ALTO, Calif. — The Pentagon has named Xerox Corp. computer scientist Lynn Conway to head its critical Defense Advanced Research Projects Agency (Darpa) supercomputer project, a U.S. effort to compete with Japan in fifth-generation computer technology.

Conway, a systems area manager and research fellow at the Xerox Research Center here, was chosen to lead the project because of her expertise in the areas of artificial intelligence and the design of powerful semiconductor devices.

Conway is best known in industry circles for coauthoring *Introduction to VLSI Systems* with Carver Mead, professor of computer science at the California Institute of Technology. She has been with Xerox since 1973.

The Darpa project carries start-up costs of $45 million, with speculation that the cost of developing a computer capable of competing with the next generation of Japanese machines will eventually total about $500 million.

The project received a boost earlier this year when President Reagan went public with a plan to launch a *Star Wars*-type technology to defend the U.S. in the event of a nuclear attack. Such a project, many experts contend, will only be viable through the introduction of supercomputers with processing power many times that of today's most powerful machines.

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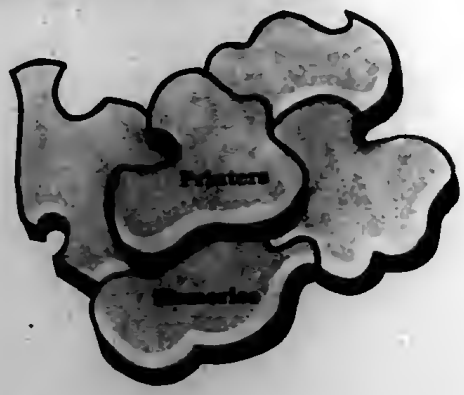


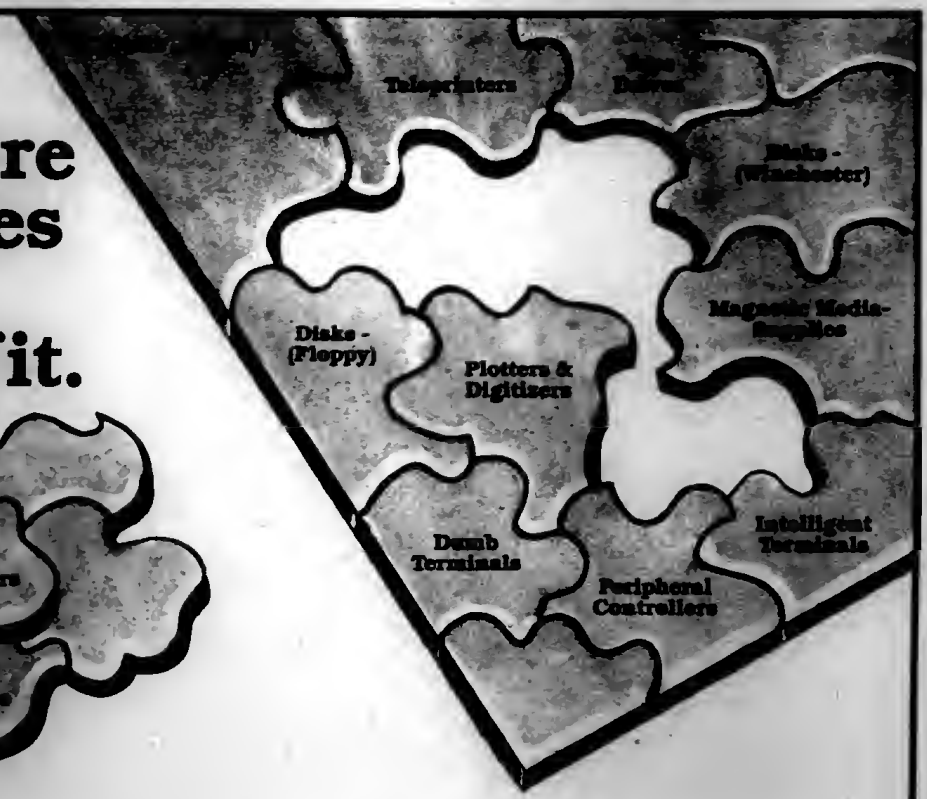


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# Subcommittee Examines U.S. Industrial Policy

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A congressional subcommittee has begun a series of hearings expected to lead later this year to comprehensive legislation on U.S. industrial policy.

Arising from a growing perception that the U.S. must react strongly to overseas competition, particularly in the high-technology areas, industrial policy has become one of the hottest political and economic topics of the last few years and will probably be a major point of debate in next year's general elections.

Nevertheless, the concept of an American industrial policy remains as poorly defined as it is controversial, noted Rep. John J. LaFalce (D-N.Y.), chairman of the Economic Stabilization Subcommittee, which will hold hearings on the subject through September.

LaFalce noted that to some the term refers to centralized, government-directed support of key industries vital to national economic health. To others, he said, it means better cooperation among management, labor and government and to still others development of a coordinated approach to government policies that might create a better climate for developing high-technology industries while protecting existing economic sectors.

"Each of these views of industrial policy has considerable merit — none are mutually exclusive of any other," he said, opening the first round of hearings earlier this month.

Basically, LaFalce said, the U.S. should respond to increased competition from abroad by "making industrial competitiveness a central focus of our society's agenda for the rest of this decade."

He warned against the danger of "studying this issue to death" and said the U.S. should not "remain uniquely passive in the area of economic management in assuming that the market alone will remedy the problems which the market itself has created.

"It is now time — in fact, past time — to respond," he said. "If we sit back and do little but rely on truisms that ignore the current realities of global competition, then foreign industries and workers will continue to enjoy a critical advantage."

The first day of hearings on the topic was largely devoted to a report on the need for a U.S. industrial policy that was delivered to the White House last month by the Business Higher Education Forum. In a letter transmitting the report to President Reagan, Rockwell International Corp. Chairman Robert Anderson, who chaired the forum, called on the administration "to elevate the competitive challenge to the top of the national agenda."

The lesson of the study, entitled "America's Competitive Challenge: The Need for a National Response," is that "our mandate must not be to punish or retard the competitive gains made by other nations, but to do a better job of competing ourselves," the forum said.

Addressing the House subcommittee, Anderson, elaborating on his group's findings, said that "just as we must avoid the pitfall of protectionism, so must we avoid the peril of increased government intervention into the activities of the private sector.

"If industrial policy simply means centralized government planning, count us out. Such a course would be inconsistent with our historic free-market traditions and counterproductive in this new era," Anderson said. "Rather," he continued, "government's responsibility is to streamline its own process and create a climate — through public policy — in which the individual and collective talents of the private sector can be focused to meet the competitive challenge."

## Executive Corner

- **Edith R. Smith** has been promoted to senior vice-president of business planning and **Sam L. Densmore** has been named senior vice-president and treasurer and chief financial officer of Banctec, Inc.
- **Charles W. Ryle** has been named president of Parallel Computers, Inc.
- **George D. Wells** has been appointed president of Intersil, Inc.
- **David M. Saykally** has been named president and chief operating officer of Context Management Systems.
- **Robert V. Adams** has been promoted to group vice-president of Xerox Corp. and named president of the newly formed Xerox Systems Group.
- **Ed Caldwell** has been appointed senior vice-president, engineering and technology; **John McNeley**, vice-president and general manager, systems technology; and **Pete Smyth**, vice-president, North American Sales, at Mostek Corp.
- **John D. Cooper** has been promoted to vice-president of operations at Precision Methods, Inc.
- **John de Wit** has been promoted to vice-president, products, at Tesdata Systems Corp.

# Radical Changes in Software Copyright Urged

By Robert Batt
CW West Coast Bureau

CHICAGO — A radical change in software copyright law is needed if the current shortage of software engineers is to be overcome, a group of industrialists was told here recently.

Speaking at the Consumer Electronics Show earlier this month, Edwin Lee, chief executive of microprocessor manufacturing at Pro-Log Corp., said reducing software copyrights from 75 years to five years could end much of the "intellectual featherbedding" which he claimed permeates the industry.

"Software, like other copyrighted works, is unconditionally protected for a period of 75 years, and filing for that protection does not require any proof of significant invention or any form of disclosure," Lee said.

Lee argued that the protection of software designs under current copyright law discourages exchange of information among software designers, forcing many software professionals to duplicate the work of others rather than explore new territory.

"It's a form of intellectual featherbedding," he said. "If software protection laws were modified to encourage a free exchange of ideas, all this duplicate effort wouldn't be necessary, and the programmer shortage we're now suffering would be tremendously reduced if not eliminated," Lee said.

This results in most software designs becoming closely guarded secrets that are not shared within the industry, he asserted. "Many so-called new software designs are created, not because they're better than existing ones, but just so the users have their own rights of copyright protection and can avoid being subject to the financial and design control of another designer who wrote a similar program earlier," he claimed.

Under Lee's proposals, software copyright protection would be limited to five years, requiring submission of source code documentation and other design disclosure as part of the copyright application process. The documentation, and therefore the software design, would enter the public domain at the end of the copyright period, he explained.

In cases where a longer period of protection is desired, Lee suggested the use of patents. The patent would require the same disclosure as the copyright, as well as proof of invention. As with hardware patents, he suggested, the software design would become part of the public record, but be restricted from duplication for profit.

"Such a scheme would give the originator of a program enough time to make a reasonable return on his work, then release it as a source from which other designers can learn or use as a basis for new developments," he explained.



## Supershorts

**Digital Equipment Corp.** has been selected by **Century 21 Real Estate Corp.** to offer personal computers to the network of Century 21 franchises in the U.S. and Canada. An estimated 1,700 computers are expected to be ordered by the end of 1983, representing a total expenditure of approximately $50 million.

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**Southern New England Telephone** has signed an agreement with an AT&T subsidiary and two small Connecticut and Massachusetts independent telephone companies to link Connecticut and the Springfield/Holyoke, Mass., area in a unified cellular radio service network. The network makes possible telephone calls from vehicles or from portable phones small enough to carry in a briefcase or handbag.

• • •

**Computervision Corp.** has signed a joint marketing agreement to offer **Structural Research and Analysis Corp.'s** Cosmos finite element analysis software program on its 32-bit computer-aided design and manufacturing systems.

• • •

**Wang Laboratories, Inc.** has signed a $100 million, seven-year contract with **Redshaw, Inc.**, a supplier of insurance office automation systems. Redshaw will offer proprietary software and Wang 2200 systems to independent property and casualty insurance agents in the U.S. and Canada.

• • •

**Apple Computer, Inc.** is offering kits for organizing student computer clubs to 10,000 elementary and secondary schools nationwide. Apple is also sponsoring a national student competition in which individuals, as well as computer clubs, can compete for travel, cash and computer equipment prizes worth over $100,000.

• • •

**Gould, Inc., S.E.L. Computer Systems Division** has awarded the **University of Florida** at Gainsville a Gould Concept 32/8780 computer valued at $682,816 and a check for $100,000.

• • •

**Control Data Corp.** will market six Plato Staywell education courses that are designed to help employees stop smoking, reduce stress, lose weight and make other life-style changes by working with a computer.

## Scottish Agency Cites Research Data

# SDA Steps Up Efforts to Attract U.S. High Tech

By Bob Johnson
CW New York Bureau

EDINBURGH, Scotland — In an effort to maintain development of a strong high-technology sector, the Scottish Development Agency (SDA) has intensified its campaign to attract U.S. semiconductor and computer companies.

For one thing, the SDA will now make available research data highlighting the business advantages of Scotland's computer industry. A profile compiled by the SDA on Scotland's electronics industry claims that Scotland's strengths lie in the knowledge and expertise gained by three generations of high-technology companies that have developed here.

"The first generation included many large U.S. companies such as IBM, Burroughs Corp., Honeywell, Inc., NCR Corp. and Hewlett-Packard Co.," the profile states. "They set up during the '50s to manufacture electromechanical business machines and information systems and have moved to full electronic production."

The SDA also maintained that over the last 20 years a second generation of electronics companies has rooted in Scotland. Six leading semiconductor companies from the U.S. and Japan have located in the Scottish central belt, the SDA said.

"Companies such as Motorola, Inc. at East Kilbride and General Instruments Corp. at Glenrothes have substantially increased their research and development and marketing capabilities to service the particular needs of European markets," the SDA said. "Over $235 million has been invested in semiconductor manufacturing in the last two years, and Scotland now produces over 50% of the total UK output."

A third generation of Scottish technological companies has further developed, the SDA stated. These include a number of start-ups engineered by entrepreneurs from the first- and second-generation companies.

Future Technology Systems, founded in 1981, claims to be the largest microcomputer manufacturer in the UK.

Rodime, Ltd., a disk drive manufacturer, headed by Californian Len Brownlow, employs over 100 people and has successfully penetrated U.S. and European OEM markets since its founding two years ago.

A spokesman for the SDA, Cameron McPhail, said the U.S. computer

(Continued on Page 86)

## Semi Makers Advised to Locate Near Chip Makers

EDINBURGH, Scotland — American dominance of the semiconductor equipment market in Europe could be lost unless more manufacturing centers are set up near the chip producers, according to the Scottish Development Agency (SDA) here.

Scotland currently is home to five manufacturing facilities of major semiconductor firms including Motorola, Inc., National Semiconductor Corp., Nippon Electric Co., General Instrument Corp. and Hughes Microelectronics Corp. The country has been particularly active in its attempts to lure more U.S. and Japanese chip makers.

"The semiconductor industry executives are becoming increasingly concerned over the problems of equipment debugging and servicing requirements and are looking much more seriously at the offerings of newcomers to the business, particularly in the UK," the SDA said.

### No Guarantees

According to Manuel Yuen, managing director of National Semiconductor, new semiconductor equipment is so complex that no manufacturer could guarantee that it is fully debugged, and they cannot afford downtime in this tight existing market.

"Even normal servicing requirements are a problem. If we are running flat-out 24 hours a day, we don't want to have a shutdown to accommodate servicing which has been arranged weeks before. What we need is a local servicing base," he said.

The SDA maintains that the expansion of semiconductor-producing firms in Scotland will not only benefit the semiconductor manufacturers, but the users of the chips as well. If the chip makers are happy, computer hardware firms will have necessary raw products nearby, and the high-technology industry will flourish. The agency pointed out that the entire industry is very interdependent.

"U.S. companies with a vested interest in high-technology products should want to maintain this strong semiconductor-producing base in Scotland," the SDA said. "It will help their business and continue to provide support for good European marketing."

# SDA Mounts Campaign to Attract U.S. Firms

(Continued from Page 85)

and semiconductor companies are the most desirable additions to his country's technology industry because of their potential for marketing end products back to the U.S.

"The Japanese, needless to say, are prominent in this business, but usually take longer to make investment decisions," McPhail said. "The U.S., on the other hand, has thousands of companies that can look to Scotland for up to as much as 30% of their potential sales."

McPhail pointed out that a combination of a brightening worldwide economy and the re-election of Prime Minister Margaret Thatcher's conservative government in the UK have induced the SDA to go full steam into high-technology expansion.

"A great deal of money has been allocated throughout the UK for various support [of high technology]," he said. "We in Scotland want to take the funds that filter down to us and fine tune them to the electronics industry in order to make the best investment."

In the area of information systems, McPhail said, "We want to see three things happen: Expansion of existing companies [IBM is now making its Personal Computers here, and Burroughs has doubled its production of B-95 banking terminals], attraction of more computer companies and attraction of peripheral companies."

The SDA claimed its expansion efforts are bearing fruit. Wang Laboratories, Inc. is currently building a manufacturing plant at Stirling University in Scotland's central region, and Applied Computer Technology, a software company, will begin producing its Apricot personal computer line in Scotland.



## AEA Listing Contains '83 Members

PALO ALTO, Calif. — The American Electronics Association (AEA) has announced its 1983 membership directory, said to list 11.5% more electronics and information technology companies than last year.

The "AEA 1983 Directory," which marks the association's 40th anniversary, features information on 2,026 companies.

Included are an alphabetical listing of AEA members, a geographic index by state and city and a division of companies into 27 product categories.

The alphabetical section lists names, addresses and phone numbers of companies, subsidiaries, divisions and parent firms; names and titles of key executives; products and services; and marketing and distribution methods.

Also included in the listings are the year each firm was established, the number of employees and, for publicly owned companies, where the stock is traded.

The directory has been sent to AEA members as an association service.

Others can order the book by sending a check for $75, plus $5 for handling and first-class postage, to "AEA 1983 Directory," AEA, P.O. Box 11036, Palo Alto, Calif. 94306.

California orders should include 6.5% sales tax.

*Program Will Start Next January*

# Esprit to Pool European Research Resources

By Rex Malik
Special to CW

LONDON — The long-awaited European Strategic Program of Research in Information Technology (Esprit) has been announced and will formally begin next January, according to the Commission of the European Economic Community (EEC).

Esprit is a cooperative program of basic research by companies and organizations working on a Europe-wide basis. The program involves all of Europe's major electronics and computing companies which, at the product level, are expected to compete.

But, taking a leaf out of the Japanese book, Esprit is a long-term program whose products might not appear before the 1990s.

In terms of financial arrangements, the EEC has put forward programs of research and development in the technology for the next 10 years, but has asked for funds for only the first five.

The application has gone forward to the Council of Ministers for roughly $800 million, around $230 million of which will be in next year's budget. Funds will be apportioned on a 50/50 basis, which means a commitment by those taking part of $800 million over five years.

Though there is argument in political circles in Europe about the level of funding due to an EEC budget crisis, it is not expected to make any real change in the program.

Among the companies involved in the program are: Plessey, Inc., General Electric Co. and ICL, Inc. from England; CGE and CII-Honeywell Bull from France; AEG-Telefunken, Nixdorf Computer Corp. and Siemens Corp. from West Germany; N.V. Philips from Holland; and Olivetti Corp. and Stet from Italy.

Although Esprit is patterned after the Japanese model, it is unlikely that any Japanese or U.S.-owned multinationals will take part, however large their European operations may be.

Under the terms of the contracts to be awarded, the companies must give assurances that R&D results are not applied to products from competing non-European countries.

Assurance that the R&D results would only feature in European operations products would be difficult for most electronics and computing multinationals, particularly where, as in the case of IBM, they operate on a worldwide or trans-Atlantic integrated production basis.

### Five Research Areas

The resultant program put together by the experts and the Commission is in base research in five areas:

- Microelectronics, particularly very large-scale integration development tools, with considerable emphasis on substantial advances in computer-aided design (CAD) tools and techniques to work at the submicron level plus the substantial leaps in complexity and density that will go with it.

  This area will take up a substantial proportion of the funds, and many of the contracts to be placed here are expected to involve as many as five or six companies in as many European countries.
- Software, particularly development processes and tools to automate software production as much as possible. This area also encompasses the European work on standards. There are expected to be common European positions and standards to which it must adhere if a company is to operate in Europe.
- Advanced Information Processing, including the areas of expert systems and advanced and novel architectures such as data base machines, data flow machines and inference machines.
- Office automation, which will contain a host of projects in the man-machine interface area.
- Computer integrated manufacturing, which sets out to integrate CAD and computer-aided engineering.

# Earnings Up For Pansophic

OAK BROOK, Ill. — Pansophic Systems, Inc. has reported a 21% increase in earnings for its fiscal year ending April 30, 1983, with earnings of $5.8 million or 80 cents per share, compared with $4.6 million or 66 cents per share for the previous year.

Pansophic's annual revenues increased to $43,061,890, up 21% from the previous year. Income before taxes was $9,577,484, up 20% from last year. Net income for the year increased 25% to $5,777,595.

Fourth-quarter revenues were $11,765,941, compared to $9,368,637 reported in the fourth quarter last year, reflecting an increase of 26%.

Product and license fees increased by 17% for the year and by 23% for the fourth quarter. Revenues from customer support fees increased by 33% for both the fiscal year and the fourth quarter.

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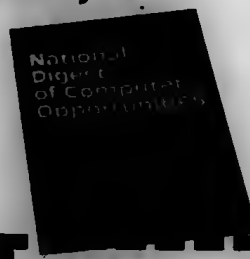


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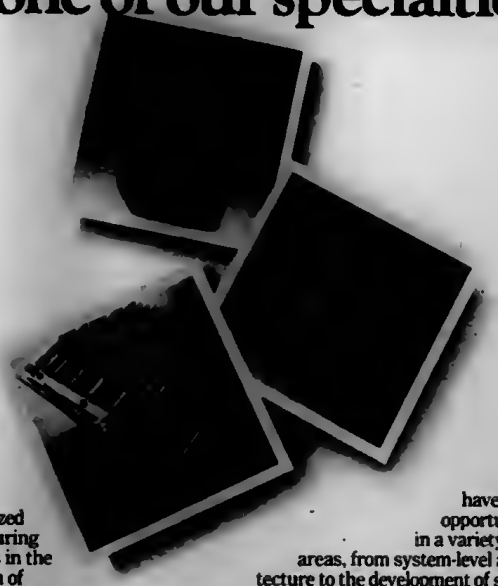

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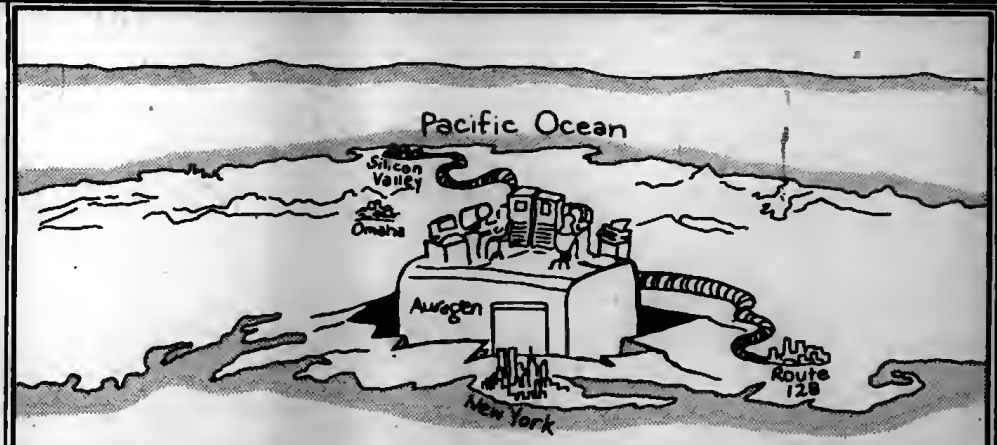


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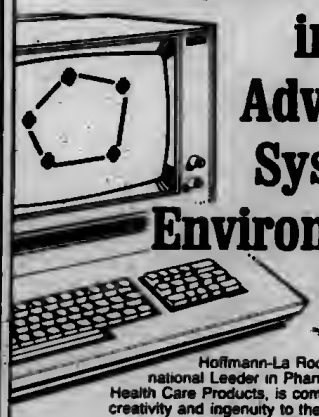

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An Equal Opportunity Employer M/F

YANKEE

**We're molecular computer . . . growing at an accelerated pace that rivals any computer company in the Silicon Valley on the San Francisco Peninsula! Its spirited, enthusiastic microcomputer wizards, we have a motto that's making it all happen: "Do it now; do it right". You can be on board, working with some of the best minds in the industry and experiencing professional achievement at its finest.**

# we're molecular computer

with a special invitation to

## EVENING INTERVIEWS

in SAN JOSE, CA, Wed., June 29th 4-7 p.m.

Join our technical management team to discuss a truly accelerated career and learn more about our micro wizardry at a technical demonstration.

Take a good look at the following opportunities which can put you into our fast-track momentum:

### Operating Systems Programmers

Work on design in support of proprietary microcomputer operating system. Several positions available for candidates with over 3 yrs. experience, preferably on microcomputer-based operating systems.

### Sr. Software Integration & Evaluation Engineer

Establish and maintain a software integration and evaluation organization. You'll define procedures for release of software into integration and evaluation as well as develop a regression and performance test for current products. Maintain & integrate source code library of programs currently in development. Evaluate specifications and release to manufacturing. Support and maintain the engineering computer system, including systems back-up, new equipment and supplies. Develop or procure special-purpose evaluation tools as needed. 3 yrs exp. in the operation of a software integration and evaluation team, the establishment of a sofware QA release control procedure & experience with software library creation and support procedures required. Programming experience with Z-80 assembly language under CP/M preferred.

### Sr. Software Engineer

In this senior-level position in Operating Systems be involved in working with project level software engineers in integrating operating systems and system-related facilities into a distributed multi-user microprocessor-based system including coding, optimization & documentation. 4 yrs. exp. in MS-DOS and BS/MS in CS.

### Third Party Software Specialist

As a member of the Software Development Team, you will work with Marketing to identify and evaluate applications software and then coordinate the software integration into Molecular's product offerings. Experience on microprocessor-based software packages a must.

If your qualifications match one of these opportunities and you're looking for a spirited & significant career move — we'd like to talk with you!

So drop by for our special EVENING INTERVIEWS, Wed., June 29th, call ahead for a specific appointment or rush your resume with salary history to Sharyn McCarthy, Professional Employment Department CW683c, Molecular Computer, 251 River Oaks Parkway, San Jose, CA 95134 (408) 262-2122, Ext. 249. Equal opportunity employer m/f/h. Individuals only apply.

molecular computer
The Supermicro Company™

## IMS TECH SUPPORT

Top calibre internals spec. sought by Fortune 500 consumer goods org. IBM OS/MVS IMS DB/DC environ. w/outstanding tech. staff. Will participate in H/S eval. & part. & capacity planning. $36,000.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

## OFFICE AUTOMATION MANAGER

$26,500 to $38,500

The City of Scottsdale wants a motivated professional with an entrepreneur mentality who is willing to share in the success of building a new program in our data processing department in telecommunications, records management and word processing. Contact Human Resources for information regarding this position.

The City of Scottsdale
Human Resources Office
7384 East 2nd Street
Scottsdale, AZ 85251
(602) 994-2401
An Equal Opportunity Employer

# WANTED: SOFTWARE ENGINEERS

**The Data Systems Engineering Group of Aerojet ElectroSystems is staffing up and is seeking the best computer people in the business—Why shouldn't it be you!**

## CURRENT PROJECTS

### SPACEBORNE DATA PROCESSING
- Distributed Systems
- 1750 Architecture
- Real-time Target Tracking
- Mission/Sensor Simulation
- Multi-processor Operating Systems
- Micro-processor S/W Development Tools
- Computer Systems Simulation

### GROUND DATA PROCESSING
- Real-time Telemetry
- Real-time Target Tracking
- Mission Display
- Ground Communication

### AUTOMATED MANUFACTUBING/ TEST EQUIPMENT
- IR Sensor Subsystem Testing
- IR Sensor System Testing
- Laser Trimming
- Analog Circuit Testing

### SENSOR DATA REDUCTION/ANALYSIS
- Sensor Performance Analysis
- Phenomenology

## LANGUAGES
- FORTRAN
- PASCAL
- DGL
- JOVIAL
- Assembly Languages
- ADA

## COMPUTERS
- IBM 3033
- VAX 11/780 & PDP11
- Perkin Elmer/ Interdata
- DG ECLIPSE
- HP-1000 & 9836A
- Microprocessors ★ M68000 ★ 1750A ★ 9900

## REQUIRED SKILLS

**These are critical requirements**

- Technical Leadership
- Real-time Software
- Operating Systems
- Structured Analysis
- Structured Design Techniques
- Application Software
- Requirements Definition
- Fault Tolerant Design
- Documentation (MIL Standard)
- Configuration Management

**Minimum of a Bachelor's Degree plus 3 years current experience is required.**

Principals only, please.

Secret Clearance will be necessary.

*** Our facility is located 25 miles east of Los Angeles in the San Gabriel Valley...near prestigious Cal Tech, and a short drive to relaxing Palm Springs and Lake Arrowhead, the ideal summer and winter resort.**

Submit your resume, including salary history, or call collect:
Frank Lanagan, Professional Staffing

Aerojet Electro Systems

**(213) 812-2254**
**P.O. Box 296-WC**
**Azusa, CA 91702**
Proof of U.S. Citizenship Required
An Affirmative Action Employer

**- A Commitment to Technical Excellence**

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# IOCS

IOCS is a nationally recognized leader in software development and systems integration/engineering. Our advancement opportunities offer competitive salaries and full benefits in a dynamic environment. Relocation package is available.

You'll find IOCS at the center of action in high technology, with Corporate Headquarters in Waltham (suburban Boston), directly off Route 128, America's Technology Highway. Our other centers of action are located at Atlantic City and Ft. Monmouth, NJ; Oklahoma City, OK; New London, CT; Portsmouth, NH; Newport, RI; and Washington, DC. But, if you keep up with new advances in software development and systems engineering/integration, chances are you already know where to find us.

## SR. PROGRAMMER/ANALYSTS

Continuing growth and success at our facility in Bethesda, Maryland has created several outstanding opportunities throughout the Washington, DC area for experienced Programmer/Analysts.

These positions require BA/BS degree (or equivalent) and 3-5 years' experience working in an MIS environment. Programming is done in COBOL with the Data General MV8000 or Eclipse. Experience with AOS, CLI, and INFOS desired.

If you're ready for real challenge in a fast-paced high technology environment, we invite you to call Kim Bishop, Monday through Friday. On the Atlantic seaboard, from ME to VA (except MA) call 800-451-1633 toll-free. All others, call collect to the number shown below. Interested applicants should send full resume with salary history, in confidence, to IOCS today.

**400 Totten Pond Road**
**Waltham, MA 02254**
**(617) 890-2299**
an affirmative action/ equal opportunity employer, M/F/H

IOCS

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## HEALTH CARE PROGRAMMER

Central Michigan located health maintenance organization (HMO) has opening for an experienced programmer. The successful candidate will have a minimum of one year's experience in a data base environment utilizing the Pick Operating System. Send resume outlining qualifications and experience to Director of Human Resources, Group Health Service of Michigan, Inc., 4200 Fashion Square Blvds., Saginaw, Michigan 48603.

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## COMPUTER SCIENCE INSTRUCTOR

needed at Big Bend Community College, Moses Lake, Washington, 98837. Closing date for receipt of all application materials: July 15, 1983. Contact Personnel Office, 509-762-5351, ext. 203. Washington State regulations prohibit the payment of travel expenses for faculty interviews. EEO employer.

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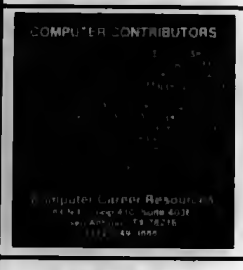


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## HARDWARE SALES
## $75K PLUS
## PHOENIX COMPUTER LEASING

The fastest growing computer hardware sales company in the Southwest is expanding and needs a top sales pro immediately. Best compensation plan available. 3-5 years experience required. Call today or forward resume to:

6900 E. Indian School Rd.
Scottsdale, AZ 85251
(602) 947-2808
J. Naumann

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# DIRECTOR, HARDWARE DEVELOPMENT

Continental Telecom's rapid growth in the telecommunications industry has opened up challenging opportunities in Atlanta, Georgia in the videotex field. We are currently seeking a talented and experienced individual to be responsible for the design, development, procurement and implementation of all hardware associated with the basic videotex system.

You must have 5 years experience in a responsible telecommunications engineering management position involving design or development. Experience in hardware design engineering, specifications and implementation at the component or system level is necessary. Requires a BS in Electrical Engineering or a related field. A Master's degree and knowledge of videotex are desired.

We offer a comprehensive salary and benefit package, and the opportunity for individual achievement. Please forward your resume and salary history to the address noted below. No phone calls, please. We will respond to those candidates in whom we have further interest.

Position: Director, Hardware Development
**CONTINENTAL TELECOM INC.**
P.O. Box 467123
Atlanta, GA 30346

CONTEL

Equal Opportunity Employer

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## UNIVERSITY OF IOWA HOSPITALS & CLINICS

The mission of the Information Systems Department is to develop and maintain a patient-centered Hospital Information System for the University of Iowa Hospitals & Clinics. Existing applications, ranging from patient registration and appointment scheduling to laboratory results reporting, are supported on a network of over 350 terminals attached to an IBM 3033. New application development is carried out on a second IBM 3033. Both computers run under MVS/SP and the applications utilized DICE, DL/I, PL/I, and IBM's Patient Care System. Development work is done using TSO/SPF. We have the following opening:

### DATA BASE MANAGER

The Data Base Manager plans and manages the activities of a 3-person Data Base Group. The group maintains the DL/I data base that supports the Hospital Information System. Responsibilities of the group include data base design, implementation, tuning, back up/recovery, standards development, and consulting. A Bachelors Degree in Computer Science or related discipline or an equivalent combination of education and experience is a requirement for the position. A working knowledge of data base technology, including DL/I, is also required. Supervisory experience is desired. The salary range is $24,000 to $35,000, with beginning salary dependent on qualifications.

If you meet the above qualifications and would like to work in an up-to-date DP environment, while living in a university community, please send a resume and salary history to:

Richard Brunner
Information Systems Department
University of Iowa Hospitals & Clinics
Iowa City, IA 52242

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position announcements | position announcements | position announcements | position announcements | position announcements

# SAUDI

## If you're looking for a solid career path, financial rewards, adventure, look into Hewlett-Packard/MEE Saudi Arabia

**H-P in the Market** Hewlett-Packard MEE, a firmly established and respected supplier of quality high-tech products in Saudi Arabia, has several career opportunities within its sales/marketing staff. Our success to date in Saudi rests largely on our commitment not only to supplying highly dependable equipment and to insuring its service to our customers, but also on our commitment to attract – and keep – talented people.

**The Opportunity** The position, Sales Engineer, is a challenge. We are looking for experienced computer sales people who are interested in both the outstanding opportunities and the unique demands of working in the Saudi market. This highly visible line position reports directly to the computer group manager. The position affords an excellent opportunity to move within Hewlett Packard's international marketing network.

**The Requirements** We are looking for experienced computer sales people preferably individuals with Hewlett-Packard 1000, and or Hewlett-Packard 3000 experience. Applicants with experience in either technical or commercial applications with OEM's or users will also be considered. English language required. Arabic a definite plus.

**The Benefits** Compensation is high and salaries are virtually tax free (5% S.S. only). Housing, car, full medical coverage provided. Paid trips to country of origin (up to three per year for singles). 45 calendar days vacation per year, excellent termination clause.

**The Contact** If you are interested in the challenge of working in the Kingdom and the benefits of a high-visibility, high-salaried position, send your resume with cover letter to:

Seppo Laaksi-Pulmo
Hewlett-Packard, S.A. Dept CW, 5,32 Kifissias Avenue, Amaroussi Athens/GREECE

*When performance must be measured by results.*

HEWLETT PACKARD

# Software Professionals

APPLIED DATA RESEARCH, the world's oldest and largest independent systems software products company, is seeking software professionals for employment in Dallas or Princeton with experience in one or more of the following:

### Software Development

- IBM systems software development using IBM Assembler and Macro Language
- Personal/Micro Computer software development using 'C' language
- Data Base/Data Communications software development

### Software Support

- Systems software positions available for both intermediate and senior level personnel in software product support.

For confidential consideration send a resume, including salary requirements, to Mr. E.D. Smith, Director of Technical Recruiting, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Rd., CN-8, Princeton, NJ 08540.

APPLIED DATA RESEARCH

An equal opportunity employer

# TECHNICAL TRAINING SPECIALIST

## UNIX* & "C"

Paradyne Corporation, one of America's fastest growing data communications companies has an immediate opening for an individual to develop and instruct courses in "C" language and the UNIX Operating System to Engineering, Marketing, and Customer Service personnel at our Largo, Florida facility.

The parson selected will have a bachelors degree in a technical discipline (Advanced degree desirable), indepth knowledge of "C" and UNIX and good presentation skills; prior experience in software instruction is desirable.

We are offering an excellent salary and benefits package. If you are interested, please send your resume to: Paradyne Corporation, Professional Staffing, Dept. V-627, 8550 Ulmerton Road, P.O. Box 2826, Largo, FL 33540.

*UNIX is a registered trademark of Bell Laboratories.

LOOK HERE IF YOU'RE LOOKING FOR CHALLENGE.

**paradyne**

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Careers In The Computer Services Industry For:

# TANDEM PROFESSIONALS

A.O. Smith Data Systems, one of the nation's leading suppliers of Electronic Funds Transfer (EFT) software and processing services, is seeking individuals to staff multiple new development projects. These positions, based in suburban Milwaukee, Wisconsin, require a minimum of 2 years experience on TANDEM hardware/software including TAL, COBOL and an exposure to the GUARDIAN TNS II Operating System.

Both our technology and applications are "leading edge" and offer high visibility and growth. We offer competitive salaries and an attractive benefits and relocation package. Please reply by resume/letter or call Gary J. Smith, Director of Personnel, at (800) 558-6980.

A.O. Smith DATA SYSTEMS DIVISION
8901 Kildeer Court
Brown Deer, Wisconsin 53209
PRINCIPALS ONLY, PLEASE
equal opportunity employer m/f

## ALASKA

### SYSTEM 34/36 PROGRAMMER

Programmer for System 34/36 installation. Qualified applicant must be well versed in RPG II, RPG III (OCL,CL-,SEU,DFU) and all 34/36 utilities. Prior experience on System 34 and System 38 required. Must relocate to Barrow, Alaska, a remote bush community. Excellent benefits furnished. Salary $48,000 to $54,000 DOE. Send resume to:

Data Management, Inc.
P.O. Box 74383
Fairbanks, AK 99707
*No phone calls*

## COMPUTER STUDIES FACULTY POSITION

Full-time to teach programming languages: BASIC, FORTRAN, COBOL, ASSEMBLY LANGUAGE, RPG; Systems analysis and design, computer concepts, telecommunication and data base. Salary range $18,000 to 22,000. Bachelor's degree required, Master's degree preferred. Send resume including title of job for which you are applying by July 11, 1983 to Office of Employee Relations, Camden County College, P.O. Box 200, Blackwood, NJ 08012.

*An EOE/AAE*

## HIRE A HOT SHOT IN THE CLASSIFIED PAGES OF COMPUTERWORLD

## DATA PROCESSING SPECIALIST

Muskegon Community College is seeking candidates for the professional staff position of Data Processing Specialist to teach data processing and support instructional classroom needs. Candidates must be certified to teach data processing in the state of Michigan as well as vocationally certified. Must have the ability to program in BASIC, PASCAL and COBOL languages. Minimum of a Bachelor's Degree in Computer Science required with experience on Sperry OS3 or IBM DOS system preferred. Salary will be commensurate with educational preparation and experience. Application deadline August 1, 1983. Interested candidates apply to:

The Personnel Office
Muskegon Community College
221 South Quarterline Rd.
Muskegon, MI 49442
616-777-0355

*An equal opportunity/ affirmative action employer*

## EDP OPPORTUNITIES

### MICRO'S

| | |
|---|---|
| IBM P.C. LAN | $60M+ |
| IBM P.C. Internals, Ald, Prasad, D/B | $51M |
| IBM P.C. Data center mgr. dev | $45M |
| IBM P.C. PrintComm degree | $35M |
| IBM P.C. 1-2-3, calc, tin cup | $27M |

### PROJECT LEADER O/L CICS

| | |
|---|---|
| S-6000 Algol/Cobol fin sys dev, MBA | $61M+ |
| Dir Apps staff 10-15, Ad'l, A/P | |
| On-line, CICS, Hands-on | $60M |
| Central Finance dev D/B, CICS | $45M+ |
| Maint DOS/VSE, dbg | $41M |
| Florida OS V81 Cobol, CICS | $36M |

### PROG/ANA

| | |
|---|---|
| OS Cobol, Dbg CICS | $41M |
| Cobol CICS Comm level | $40M |
| Learn CICS OS Cobol/Ana, dbg | $37-40M |
| Fin sys dev OS Cobol, Im CICS | $36M |
| BAL DOS/VSE CICS | $37M |
| Cobol DOS/VSE VSAM | $37M |
| Florida OS V81 Cobol, CICS | $33M |
| Call Bill Bonnell | (212) 349-3618 |

WM. HARRIS ASSOC.
39 Ann St. agency NY,NY 10005

## STATE DATA ADMINISTRATOR

**($26,397 - $36,781)**

Applicants should have extensive knowledge of state-of-the-art data processing techniques, systems development, design, data base modeling, data base administration, data base management systems, data dictionary systems, and data resource management. The successful applicant will be responsible for establishing statewide planning, coordinating, and monitoring data base related activities within the Commonwealth of Virginia. The position will be oriented toward supporting executive management including cabinet members, agency heads, and agency data base administrators and formulating, establishing and maintaining a centrally administered set of data base related standards and procedures for all State agencies and institutions. Applicants should also be familiar with governmental practices and procedures, and department organizations and their interactions.

Requires a BS or BA in either computer science management information systems, engineering, mathematics, business administration, or a related discipline plus extensive experience in various aspects of data processing management in the area of data base administration. A graduate degree and one of the above disciplines is preferred. Please apply no later than the close of business July 29, 1983 designating position number W0106 to:

The Department of MASD
James Monroe Bldg. 6th Fl.
101 North 14th Street
Richmond, VA 23219
Attn: Personnel Office

EEO/Affirmative Action Employer

## 300 DP OPENINGS

| | |
|---|---|
| Electronic Warfare Software Engr (2 yrs) | 25-40k |
| Mfg Prog Anal (2 yrs Mfg Appl, IBM or DEC) | 25-35k |
| ACP PARS Prog Anal Sys Anal (2 yrs ALP PARS) | 28-40k |
| Data Prep Asst (2 yrs Some Appl, IBM 370) | 20-25k |
| Data Syst Anal (3 yrs IMS, CICS or VOS4) | 28-35k |
| Insurance Prog Anal (2 yrs IMS, CICS) | 21-28k |
| Prog Anal (2 yrs Uni- 1100, DMS, 1100) | 23-30k |
| Prog Anal (2 yrs IMS, CICS or IDMS) | 25-35k |
| Prog Anal (2 yrs HONEY WELL 6[illegible] DM or TP) | 25-34k |
| Prog Anal (2 yrs HP 3000) | 25-30k |
| Syst Anal (3 yrs IMS, CICS or IDMS) | 28-35k |
| Sys Prog (2 yrs OS or DOS VSE) | 25-35k |
| Syst Prog (2 yrs IMS, CICS or IDMS) | 27-40k |
| Comm Sys Prog (2 yrs ATAM, NCP, SNA) | 27-40k |
| SEC Sys Prog (2 yrs PDP-11 or VAX) | 25-40k |
| SEC Software Engr (2yrs PDP-11 or VAX) | 25-35k |
| Software Engr (2 yrs Z80, 8086, M68k) | 25-40k |
| Software Engr (2 yrs UNIX, C) | 25-35k |
| EDP Auditor (2 yrs EDP Audit -IBM S/3x) | 24-30k |

61 employment agencies, #1 DP employment consultant for 1982 in 3 of 150 agencies, 500 consultants, now with NYC 1100 agencies, 400 consultants. Fee paid.

Keith Young (704)366-1600
**CORPORATE PERSONNEL CONSULTANTS, INC.**
3700 Latrobe Drive, Suite 310
Charlotte, NC 28211

## SYSTEMS ANALYSTS AND PROGRAMMERS FOR SUNBELT LOCATIONS

Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you aware of what your true value is in the market place. Absolutely no obligations, please call or write Austin Ratchie, CPC, Data Processing Specialist.

**Dunhill**
OF CHARLOTTE, INC.
6401 Carmel Road, Suite 107
Charlotte, North Carolina 28211
800-438-2012
(NC Call)
(704) 542-2012

# UNITED AIRLINES

## ATTENTION PARS PROGRAMMERS ANNOUNCING:

## • IMPROVED SALARY PROGRAM
## • NEW JOB PROGRESSION OPPORTUNITIES
## • NEW PARS SOFTWARE EFFORT

Exciting new plans for the expansion of our APOLLO reservations systems have created an immediate need for PARS software professionals at our Denver Computer Center.

We have just announced a new salary program that makes United highly competitive within the industry. Our relocation assistance program will ease your transition to the beautiful Denver area. And the career potential inherent in our plans for the future **cannot be matched.**

Investigate today! We're prepared to discuss your potential compensation and relocation package immediately.

**CALL COLLECT THIS WEEK!**
**303-779-2423**

Or send a resume in complete confidence to: **Professional Employment, United Airlines, P.O. Box 3194, Englewood, CO 80155.**
*An Equal Opportunity Employer.*

## DENVER COMPUTER CENTER

### THE PROJECTS:

New development efforts to enhance our existing IBM base with high level networking, interprocessor communications, applications, ACP/CCP systems and more.

### THE ENVIRONMENT:

IBM 4341, and 9083 Processors, Amdahl V8, 3350 DASD Subsystems, CC85 (ALPS) Front Ends, and the world's most advanced telecommunications network

### THE POSITIONS:

**PARS APPLICATIONS PROGRAMMERS**
At least 2-3 years experience using IBM ASSEMBLER-PARS or equivalent required.

**SYSTEMS ANALYSTS**
ACP/CCP experience coupled with background in interprocessor communications systems, LCN's, and high level networking required. Systems development background using PARS or equivalent essential.

## EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives salary location restrictions education and experience (including computers models operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide you decide.

RSVP SERVICES, Dept. C
Suite 700 One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd., Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

**RSVP SERVICES**
*Employment Agents for Computer Professionals*

## NEW START-UP OPPORTUNITIES

Five-Month specialises in the placement of all programmers and systems analysts. Our present openings are with Top Fortune 500 companies with special emphasis on NEW START-UP opportunities on a local and regional basis. For a clear understanding of our client's needs and to know your true value in today's market, call Robert Montgomery at 919/872-5040 or send resume to

**FOX-MORRIS**
Personnel Consultants
Since 1962
3101 Poplarwood Court
Raleigh, NC 27626

## Mumps Programmer/ Analyst

Damon Corporation is seeking applicants in its Medical Services Group for the position of programmer/analyst. Perticuler experience must include MUMPS programming, preferably in a clinical laboratory environment. DSM-11 experience is desirable. Candidates should also have the ability to effectively interface in the user community. Some travel necessary.

**Interested candidates should send resume and salary history to Human Resource Department, Damon Corporation, Box M, 115 Fourth Avenue, Needham Heights, MA 02194. We are an equal opportunity employer m/f/h.**

DAMON

## THE RESUME SYNDROME

19 of 20 Resumes end up in somebody's wastebasket. If you want your resume to be the 1 in 20 that gets results, send $5.00 for our booklet, "How to Write A Resume." To received a FREE COPY, attach a copy of this ad to your resume and mail it to:

Dossin Associates, Inc.
1626 Westcliff, Suite 120
Newport Beach, CA 92660

## COMPUTER TECHNOLOGY TEACHER

**BRAZOSPORT COLLEGE**
**LAKE JACKSON, TX**

Bachelors Degree plus 3 years work experience or equivalent computer related experience. BC is a 2 year community college located on the Gulf Coast of Texas. Excellent fringe benefits, insurance program, 12 month contract offered. Position filled upon location of suitable applicant. Contact Personnel Office, Brazosport College, 500 College Drive, Lake Jackson, TX 77566, (409) 296-6131 Extension 204. EOE-M/F

## SINGLE PROGRAMMERS IMS or CICS

IMS Database or CICS experience...we supply personnel for several large consulting firms nationwide mostly eastern seaboard. IMS and CICS is needed now...take this opportunity to build on your experience and salary.

**Executive Consultants**
1000 Fairfield, Suite 410
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(318) 222-1600

# SAUDI ARABIA

## PROFESSIONAL CHALLENGES AND RICH REWARDS

The King Fahad Hospital, Saudi Arabian National Guard, in Riyadh, Saudi Arabia is one of the most modern and sophisticated in the world. Opening its first 31 beds in November 1982, this 500 bed general acute care facility and medical city complex is fully-automated and computerized, emphasizing the continuing commitment in Saudi Arabia to providing the finest in health care.

This sophistication enables you to focus your skills and training directly on your Data Processing specialism while enjoying the rich rewards of working and living in another culture. On behalf of our client HOSPITAL CORPORATION OF AMERICA INTERNATIONAL LTD., we are seeking:

## D. P. PROFESSIONALS HOSPITAL INFORMATION SYSTEMS

### Senior Analyst Programmers

Under the guidance of the Manager Systems Development, you will provide the analytical and programming expertise to ensure the successful delivery of the full range of hospital applications. You should have a proven track record in health care systems utilizing structured techniques. Degree in Information Systems, Computer Science or a related discipline is required. Family status accommodations are offered.

### Senior Compuler Operators

We have excellent single status opportunities for experienced DEC computer operators with demonstrated leadership abilities and direct background in the operation of DEC hardware.

Employment is on an initial 12 or 24 month contract basis with attractive compensation and extensive benefits including 30 days annual paid leave, bonus pay and bonus leave.

**ARABIC SPEAKING CANDIDATES ARE ENCOURAGED TO APPLY. TEMPORARY CONSULTANCY ASSIGNMENTS ARE ALSO AVAILABLE.**

Please call collect or send your resume, in confidence, to Frank Behan.

JONATHAN WALSH & ASSOCIATES LTD
JWALSH
QUALITY CARE
AUTHORIZED REPRESENTATIVE HCA INTERNATIONAL LTD.

JONATHAN WALSH & ASSOCIATES, LTD.
Department 221
Two Robert Speck Parkway
Suite 1410
Mississauga, Ontario
L4Z 1H8, Canada
Tel: (416) 275-8336

# QUALITY ASSURANCE ANALYSTS

New Jersey based state-of-the-art data processing center for multi-national consumer products manufacturer has an immediate need for career minded quality assurance analysts. Positions will provide review and measurement of systems development plans, activities, and deliverables for conformance to standards.

Candidates should possess 3 to 8 years of software development experience including 1 to 2 years of business systems development or project management experience. Successful applicants will also have backgrounds in quality assurance, test or support activities within a development organization. Technical education desired.

In addition to stimulating growth oriented positions with excellent compensation commensurate with ability, we offer an excellent package of security benefits including company paid health, dental and life insurance, a non-contributory pension plan, as well as liberal education and recreation benefits.

Interested applicants should submit a resume and introductory letter outlining earnings history and expectations to Personnel Manager

**INFORMATION SERVICES GROUP**
2 Emory Avenue
Randolph, New Jersey 07869
An Equal Opportunity Employer, M/F

# Software Engineers for New Product Development in South Florida

As one of the world's leading suppliers of state-of-the-art communications products, Racal-Milgo's ongoing commitment to innovation in communications technology is evident. Our engineering department has opportunities for real-time assembly language software specialists. New product development in local area networks, statistical multiplexers, and encryption devices has created positions in our digital products group at all engineering levels. Experience using Motorola 6800, Intel 8085, and Z-80 is preferred and a knowledge of communications protocols would be useful.

Racal-Milgo offers excellent salaries, complete company benefits including 100% paid tuition, life/medical/dental insurance, and one of the most pleasant working environments in South Florida. Please send your resume to *Alan MacFarland* or call *305/591-5904* (collect) for details and application.

**Racal-Milgo®**
7800 W. Oakland Park Blvd., Dept. 2153AM
Ft. Lauderdale, Florida 33321
Equal Opportunity Employer

# DATA PROCESSING

E. R. Carpenter Co., Inc. is the world's largest producer of comfort cushioning materials. The growth we continue to enjoy is firmly based on superior technology, quality products and service to our customers. The EDP staff, located at the Corporate Headquarters, is expanding to better answer our present and future needs. IBM 4331 DOS/VSE serves as our main frame. DEC VAX 750 systems are now being installed in all outlying locations. COBOL is the primary language.

We seek individuals for the following key positions:

- **Vax Technical Support**—Minimum of 4 years experience, 2 years on DEC VAX 750 hardware, VMS operating system. Duties to include Systems Support and Contract Administration. Experience with device drivers required. College degree preferred.
- **Systems Analyst Manager**—10 years managerial experience analyzing and defining both manufacturing and financial business problems. College degree required. MBA a plus. Exposure on both IBM main frames CICS, COBOL and DEC computers.
- **Systems Analyst**—5 years analyzing and defining business problems in both manufacturing and financial environments. College degree required. Should have exposure on both IBM main frames CICS, COBOL and DEC computers.
- **Programmer Analysts**—with a minimum of 3 years design and coding experience in either financial (A/R, A/P, G/L) or manufacturing applications. A Bachelors Degree is required and CICS experience is required.
- **Programmers**—2 years experience in financial and manfacturing applications. You must have good COBOL skills. Bachelors degree required.

If you seek a challenging and rewarding position in an exceptional location, please send your resume (with salary history) to the following address. All replies confidential.

Jim Collier, Sr. Employment Coordinator
**E. R. CARPENTER COMPANY, INC.**
P.O. Box 27205, Richmond, Va. 23261

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**Manager, Programming Services**

Clarkson College, in Potsdam, New York seeks an individual to coordinate the development of information processing systems in support of the college's administrative functions. The manager will head a team of five Programmer/Analysts, and will interact closely with departmental liaisons, as well as operations, technical support, and computing service groups. A Bachelors degree is required, coupled with significant experience as a Programmer/Analyst, preferably in an IBM environment with COBOL and VS/AM. Familiarity with PL/1, fourth generation languages, and data base systems is desired. Our present system is an IBM 4341-2, running VM/CMS, OS/VS1, and MUSIC. Clarkson intends to provide the college community with a comprehensive network of computing facilities, including wide spread use of personal computers linked to the central data bases. Salary will be commensurate with qualifications and experience. We offer an excellent benefits package, and our employees are encouraged to enter Bachelors, Masters and Doctoral degree programs. Send resume, with salary requirements, in confidence to:

**Richard D. Valente, Director, Educational Resources Center,**
**Clarkson College,**
**Potsdam, New York 13676**
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**NH - MAINE**
**NEW ENGLAND**

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For your expertise we will pay you up to $500 per day or, if you wish a high salary. Either way you'll receive a company car, comprehensive benefits, high visibility and relocation costs.

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Data Processing

# Move up to the leader

Bank of America, in San Francisco, has traditionally been an innovative force in the banking and financial services industry. Working with some of the latest and most sophisticated hardware in a wide range of computer languages and data communications applications, our state-of-the-art environment constitutes a true challenge for the experienced DP professional. Our immediate openings include:

## Sr. Systems Consultants

In either of two openings, you will work with our Corporate Personnel Department and will be involved in large scale, data base oriented development projects utilizing IMS, IMSADF, COBOL DLI1, structured techniques and data/functional analysis and will design, code and test on-line and batch programs. To qualify, you will need a strong related background with exposure to TSO, SPF, BTS, Data Dictionary, IBM 3081 and IMS DB/DC preferred. Personnel or Payroll experience a desired plus.

## Sr. Systems Analysts

We have two openings for individuals to be involved in maintenance, enhancement, systems solutions, development and implementation in support of Personnel Systems. One assignment is oriented to an interactive computing environment and consists of numerous applications primarily structured around NOMAD. The other assignment maintains the bank's employee data and consists primarily of COBOL modules. Positions also involve user interface, research, coding and testing and require occasional weekend on-call support. To qualify, you will need 3 or more years' related experience and knowledge of TSO, IBM Utilities and OS/JCL.

Bank of America offers competitive salary and benefits and the chance to work on significant projects for one of the world's largest banks. We are unable to accept phone inquiries. If interested, please send resume and salary history with a cover letter indicating position of interest to: Bank of America, Management Recruitment Dept. 3442-0627A, P.O. Box 37000, San Francisco, CA 94137. An equal opportunity employer m/f/h/v.

THE PROFESSIONAL'S CHOICE.
BANK OF AMERICA

# Networking at Hewlett-Packard

Hewlett-Packard's Information Networks Division in Cupertino, California, produces the technology that connects diverse data communication systems into fully interactive networks. The following opportunities exist for people to apply this technology in solving customer-related problems.

## Data Communication Support Engineer

As product support engineer, your primary duty is to monitor customer data communications networks, resolving problems as they arise. Working within a factory environment, you'll be using resources that are unavailable to our field engineering force in solving these customer issues. You'll be interacting with R&D at a highly technical level, and must also be able to effectively communicate the status of your problem solving with our field support teams. Your hands-on experience will help R&D develop new products, while your personal communication skills help our customers and field service groups better utilize existing products.

Requirements include a Bachelor's degree or equivalent in computer science or electrical engineering. Background in IBM data communications is essential, specifically in the following technologies: SNA, VTAM, NCP, 3270 devices, and DPPX/RJE 8100.

## Network Integration Specialist

You'll develop special system software to integrate HP database and networking products. Development efforts are targeted at 6-to-12 month projects that will provide networking and database solutions to specific customer requests.

Requirements include a BS in computer science or equivalent, and 3 years of experience.

Hewlett-Packard offers an excellent salary and benefits package to all employees. Among these are cash profit sharing, stock purchase plan, basic life and group medical, dental, and disability insurance and retirement plans.

Please send your resume, with salary requirements, to: Hewlett-Packard Company, Information Networks Division, Attn: Technical Employment Manager, 19420 Homestead Road, Cupertino, CA 95014. We are an equal opportunity/affirmative action employer.

**Where Performance Is Measured By Results**

HEWLETT PACKARD

# SYSTEMS AND DATA PROCESSING OPPORTUNITIES

CNA Insurance, a $9 3 billion leader in innovative, multi-line insurance and financial services, is on the leading edge of large systems and data processing technology, utilizing predominantly IBM state-of-the-art equipment. Our continued growth and preeminence in our industry provide a prime environment for individuals seeking greater professional development and rewards. Please join us for these excellent opportunities in our Chicago corporate headquarters.

**• CAPACITY PLANNERS**

Position requires a minimum of 3 years capacity planning experience including SMF, RMF, and SAS

**• MANAGER/ON-LINE SYSTEMS**

Requires at least 3 years experience on software maintenance procedures and IMS/VS and/or CICS/VS

**• SYSTEMS & APPLICATIONS PROGRAMMERS**

Candidates must possess a minimum of 2 years experience with IBM 370, 3033, and/or 3081. Knowledge of IBM/MVS, CICS/VS, MVS/SP, DASD, telecommunications software, VTAM, COBOL, BAL, TSO, JCL, and IMS Database preferred

**• TELEPROCESSING SOFTWARE ANALYSTS**

Position requires a minimum of 3 years experience with telecommunications protocols BYSNCH, ASNCH, and SDLC

As a leader in the insurance industry, we can reward the qualified candidates with an excellent compensation package which includes Life/Health Insurance, Dental Plan, Savings Plan and advancement potential. For prompt consideration, please send letter or resume including salary history, in confidence, to or CALL COLLECT

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Chicago, IL 60685
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## MICROCOMPUTER SYSTEM ANALYST

Analyzing customers' requirements in the areas of Accounts Receivable, Accounts Payable, Sales, Payroll, General Ledger, and Inventory control. Will design, modify, and analyze computer programs for use in the Portec computer using its multi-terminal basic to satisfy requirements. Prepares flow charts, software instructions, debug and perform on-line modifications as necessary. Will prepare documentation of programs and requirements. Analyzes entire computer system to determine compatibility of programs with entire computer system. Will delegate program design modules to programmer for coding and implementation.

Requires B.A. or M.B.A. degree in Business Administration. Must have working knowledge of microcomputers using the Basic language. Also requires ability to program the Portec Computer using its multi-terminal business basic. Must also have sufficient computer knowledge to perform the tasks specified in the job requirement. Hours 8:00 a.m. to 5:00 p.m. - 40 hours per week at $423.08 per week salary. Please send resume to: Job Service of Iowa, 150 Des Moines Street, Des Moines, IA 50316, Job Order #1344684.

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DASD Corporation is part of the internationally respected Cap Gemini Sogeti group. Major corporations call on us for creative software solutions to complex problems in Science, Banking, Manufacturing and Business Applications. We have immediate openings in major cities across the nation for data processing professionals with three or more years of experience in

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# GREECE

## Unique opportunities for unique individuals

**H-P in the Market** Hewlett-Packard is an established and respected name in the computer field. Presently we have several career opportunities in our Sales and Service Departments as a result of expanding operations. Our international success to date rests largely on our commitment not only to supply highly dependable hardware and to insure its service to our customers, but also on our commitment to attract – and keep – talented people

**The Opportunities**

- Sales Representative This highly visible line position reports directly to the Computer Group Manager. The position affords an excellent opportunity to move within Hewlett-Packard's international marketing network
  We are looking for experienced sales people, preferably individuals with Hewlett-Packard 1000L and or Hewlett-Packard 3000 experience. Applicants with experience in technical or commercial applications with OEM's or users will also be considered. Greek nationality and fluency in Greek a prerequisite for some positions
- Service Engineer This staff position requires an experienced (2-5 years) Hardware Service Engineer. Knowledge of Hewlett-Packard hardware plus a Degree in Electrical Engineering required
  Some positions require fluency in Greek
- Software Engineer. 2-3 years Hewlett-Packard, OEM or user experience required. Degree in Computer Science a must, fluency in Greek and Greek nationality preferred for some positions.

**The Contact** If the warm, sunny, adventurous climate of the Mediterranean appeals to you, make your computer experience pay off for you in Greece!

Send resume with cover letter (specifying position, fluency in Greek) to: Seppo Laahe-Pohto
Hewlett-Packard, S.A. Dept CW G/32 Kifissias Avenue, Amaroussi Athens, GREECE

*When performance must be measured by results.*

HEWLETT PACKARD

## SELECTIVE CAREER OPENINGS IN EXPORT MARKETING

The U.S. Foreign Commercial Service (US/FCS) of the U.S. Department of Commerce is seeking a few highly qualified mid-level executives with at least four years of work experience, mainly overseas, for career-candidate and limited (non-career) appointments for world-wide service. Competition for these positions is rigorous. In the most recent recruitment cycle, there were more than 1300 applicants. Applicant qualifications should include substantial management experience, well-developed inter-personal skills, proficiency in at least one foreign language, and extensive knowledge of the international trade environment. The US/FCS is especially interested in applicants who have export marketing experience and solid technical qualifications in computers and peripheral equipment.

Only U.S. citizens are eligible for appointment. The most well-qualified applicants may be offered career-candidate appointments or limited (non-career) appointments of up to five years.

**COMPENSATION:**

– $25,631 to $63,115 depending on experience and qualifications

– While abroad, housing and education allowances.

**TO APPLY:**

Contact nearest U.S. Department of Commerce District Office or write U.S. Foreign Commercial Service (US/FCS/EM), P.O. Box 688, Washington, D.C. 20044-0688. NOTE: FINAL DATE FOR RECEIPT OF COMPLETED APPLICATIONS IS AUGUST 31, 1983.

*WE ARE AN EQUAL OPPORTUNITY EMPLOYER*

## SOFTWARE DEVELOPERS

The continued growth and success of Goal Systems has opened a number of positions for experienced software developers. We are looking for creative and self-motivated individuals to develop and enhance system software products for IBM DOS/VSE, MVS, and VM operating system environments. Positions are available in the general areas of:

- DATABASE MANAGEMENT SYSTEMS
- COMPUTER BASED TRAINING
- OPERATING SYSTEM EXTENSIONS
- CICS EXTENSIONS
- PERFORMANCE ANALYSIS
- INTERACTIVE SYSTEMS

All candidates must be expert in the IBM/370 Assembler and Macro languages, must be well versed in IBM operating system interfaces, and have detailed knowledge of their areas of interest, including internals where applicable.

If you'd like to put your skills to work doing something significant in a company that is going somewhere, send your resume in complete confidence to:

*Mrs. Betty Bruce*

**Goal Systems International Inc.**
5455 N. High St. Columbus, Ohio 43214
(614) 888-1775

Goal Systems

## DP PROFESSIONALS

*In two decades, we have expanded from a $20 million enterprise to a $3 billion diversified, international, service management company.*

*Our continued growth has created several challenging career opportunities within ARASERVE'S systems development group:*

### SR. SYSTEMS ANALYST

- Requires 5-7 years experience in the development and implementation of business applications utilizing a structured systems design methodology. Knowledge of project management techniques is required.
- Candidates must possess solid leadership and excellent communication skills for this high visibility position with strong growth potential.

### SYSTEMS ANALYST

- Requires 3-5 years experience in structured systems analysis and design; COBOL programming background is a definite plus. Excellent communication and user interface skills are required.
- The ideal candidate will possess food service line of business knowledge and be willing to travel nationally 30 to 40%.

### PROGRAMMER ANALYSTS

- Requires 2-4 years experience in COBOL, BASIC and FORTRAN programming in a business environment with demonstrated capability in systems analysis and design. Good communication skills are necessary for these high growth opportunities.
- Selected individuals will work on a state of the art, micro-computer version of our highly successful FOCUS time sharing system. *FOCUS is ARA's proprietary system for mechanized food service production, planning and control.*

A Bachelor's degree or equivalent is required for the above. Experience with commercial food service applications, microlmini computer systems and METHOD 1 are highly desirable.

We offer an excellent salary, a comprehensive benefits package, an in-house training program and an opportunity to work and grow with a team of professionals. Please send resume (salary history must be included) to B. CAPPUCE at the address shown below.
*DIRECT APPLICANTS ONLY!*

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Independence Square West, Philadelphia, PA 19106
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## DATA PROCESSING PROFESSIONALS

Challenging opportunity to develop application systems. Regional Informational Services is a computer consortium located in a pleasant Central Wisconsin location. Current openings are for positions providing vital MIS support to local governments. We are seeking computer professionals able to interface with key users to analyze, design, develop and implement applications that run in an interactive environment. Preference will be given to individuals having at least a Bachelors degree with a concentration in business and computers. Salary will be dependent upon qualifications. Qualified individuals should send resume to: Regional Informational Services, Attn.: Carl Krueger, 407 Grant Street, Wausau, WI 54401, (715) 842-3359.

## IMMEDIATE OPENING FOR STRUCTURAL ENGINEERING APPLICATIONS SOFTWARE PROGRAMMERS

Two Research Engineer positions for Structural Engineers with experience in Advanced Engineering FORTRAN Programming. One position requires a Ph.D in Structural Engineering or Engineering Mechanics. The other position requires a minimum of a B.S. in Civil Engineering with an emphasis in structures. The position offers exceptional opportunities to develop large-scale structural engineering software systems for worldwide distribution. Salary is commensurate with experience. Send resume, references, current salary, and availability information to: Dr. L. Z. Gobac, GTICES Systems Laboratory, School of Civil Engineering, Georgia Institute of Technology, Atlanta, GA 30332-0355.

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## HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. And, among our 529,650 readers at user organizations about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads). No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

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**(Computer Capacity Performance)**

THE COMPANY

Explore opportunities for professional growth with an aggressive, growing company at the vanguard of the financial services industry.

Goldome is the second-largest mutual savings bank in the nation, with assets in excess of $10 billion. Following its strategic plan for growth, the bank, in little more than a year, more than tripled its assets and quadrupled the number of branch offices.

Dramatic growth has created demands for substantial expansion of systems support.

THE POSITION

This is a new position reporting directly to the Manager of Technical Services. Successful candidate will be responsible for keeping abreast of hardware capacity in order to maintain state-of-the-art capabilities.

BACKGROUND REQUIREMENTS

- IBM MVS operating knowledge
- Several years experience in capacity planning for large IBM main frames
- Good communications skills

COMPENSATION

Goldome offers a competitive salary, benefits and relocation assistance package.

Please submit resume with salary history in confidence to:

Theo Pappas, Technical Recruiter
Goldome
Box CW 783
One Fountain Plaza
Buffalo, New York 14203

GOLDOME™

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# MVS Systems Programmers

## If You Want

- *Hands-on assignments with IBM and compatible software products*
- *A good internal career path*
- *A strong team environment*
- *Regular closure and success*
- *An opportunity to expand your systems programming career to include technical marketing experience*
- *A visible position where you contribute directly to product sales...*

## Consider the Amdahl Advantage in our Performance Evaluation Center Sunnyvale, California

*Amdahl's Benchmark and Performance Analysis groups are expanding operations as a direct result of the successful introduction of the 5860 and other new products. These new positions in our Marketing Technical Support organization include building software systems, installing products, tuning and measurement, performance analysis, and performance demonstration of customer and internally developed workloads on current and future Amdahl products.*

*Your MVS-based Systems Programming expertise should be in one or more of the following areas:*

- *Measurement & Tuning*
- *IMS*
- *CICS*
- *TSO*
- *Performance Analysis*
- *TCAM/VTAM/NCP, etc.*

*With some management experience, you could qualify for a Project Leader position.*

*From the beginning, Amdahl has invested time, care and effort in motivating and supporting quality people. Discover the advantage of working with the industry's top professionals in Systems Programming and Marketing Support.*

*We invite qualified DP professionals to call* ***A. Ashley at (408) 746-7883*** *to discuss these opportunities further. Or, you may send your resume to* ***A. Ashley, Manager, Benchmark and Performance Analysis, Amdahl Corporation, Dept. #6-096, MS-116, P.O. Box 470, Sunnyvale, CA 94086.*** *We are an equal opportunity employer through affirmative action.*

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*Discover The Advantage*

inc. SPSS

SPSS, Inc., a leader in the development of quality general purpose software for data analysis, has immediate career opportunities for creative people to be a part of a highly skilled team. Our professionals design and enhance state-of-the-art software, contribute directly to the development and success of the company, and continue their technical and monetary growth. We currently have openings for 2 experienced programmers. Both positions require 3 or more years of intensive FORTRAN experience working on large-scale software. Experience with IBM assembler and OS or CMS operating systems preferred. Multiple machine or language experience is desirable.

## Software Design Programmer

The successful candidate will have experience in the design and implementation of large-scale software and will be responsible for the development of new features.

## Product Support Programmer

Experienced programmer to support sophisticated software product. Position requires good problem solving skills and the ability to work effectively with customers.

If you are an experienced professional desiring a creative, challenging and progressive work environment, we are interested in talking to you. The company pays excellent salary and provides a superior vacation plan. Relocation assistance will be offered. Send your resume to, or contact:

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Manager, Technical Recruitment
**SPSS, Inc.**
444 N. Michigan Ave.
Chicago, IL 60611
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**COMPUTER APPLICATION SPECIALIST III**
**(SYSTEMS ANALYST III)**

Enjoy living in the beautiful mountains of Northern Arizona near the Grand Canyon. Northern Arizona University and the Arizona Public Schools Computer Consortium are presently seeking a qualified individual who has extensive knowledge of COBOL, Databases, Telecommunications and Honeywell CP6 or CP5 operating systems. A Bachelors degree in Computer Science and three years of systems and/or programming experience or equivalent related experience preferred. Interested applicants should apply through the Personnel Department, Northern Arizona University, Box 4113, Flagstaff, AZ 86011. NAU is an Equal Opportunity/Affirmative Action/Title IX/Section 504 Employer.

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**SYSTEMS PROGRAMMER DOS/VSE & VM/370**

HARFORD COMMUNITY COLLEGE has an immediate need for an experienced Systems Programmer. The position reports to the Director of Computer Services. The College is currently running an IBM 4341 with 3340/3350 disks and VM/370, DOS/VSE, CICS/VS, VOLLIE, UFO, SPSS, VSAM, BTAM, etc. The successful applicant will be assigned to work at the Harford County Computer Center approximately one-half of the time on a scheduled basis. The County is running an IBM 4331 with 3340/3370 disks, using DOS/VSE, CICS/VS (Command Level COBOL), ICCF, VSAM, etc.

A Bachelor's Degree is required. Candidates with three years of experience in systems programming in a comparable environment will be given preference.

Starting salary ranges from $26,700 to $34,100 (depending on education and experience), plus an excellent benefits program. The maximum salary on the scale is $39,495. For additional information, call Bob Slawson at (301) 836-4234.

To apply, send a letter of application and a resume of education and work experience to Edward C. Kuhl, Director of Personnel, Harford Community College, 401 Thomas Run Road, Bel Air, Maryland 21014, on or before July 24, 1983.

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HARFORD COMMUNITY COLLEGE

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If you've answered yes, you're ready for a 1 year, single status assignment in **Saudi Arabia.** The following professional opportunities are now available:

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Over 3 years PL/1 experience. TSO/SPF, OS/JCL, IMS, DB or DC, COBOL, MARK IV, APL, ADF, BMP, SAS.

**JR./SR. SYSTEMS ANALYSTS**
PL/1 experience required, TSO/SPF, OS/JCL, IMS, DB or DC, COBOL, MARK IV APL, ADF, BMP, SAS.

**SR. CONSULTANTS**
PL/1 experience and over 10 years experience in EDP.

TMSI is a recognized leader in providing technical services to the Middle East, and can offer qualified individuals an exceptional compensation package, airline allowances, plus room & board or equivalent. For consideration, **please forward your resume in chronological order and a copy of your diploma to:**

tmsi TECHNICAL MANAGEMENT SERVICES, INC.
3250 Wilshire Blvd. Suite 343
Los Angeles, CA 90010

# WYOMING
## UNIVERSITY COMPUTER SERVICES

The Division of Computer Services at The University of Wyoming provides a broad base of hardware and software services and support for both academic and administrative computing. Computer Services also administrers the central facility, which houses a CDC CYBER 730 and a CDC CYBER 760 as well as several minicomputers. In support of this activity, the following position is available for immediate hire:

### PROGRAMMER ANALYST III

Supports the administrative computing effort in a senior consultant role. A primary function is to assist in developing new general-purpose utility applications in administrative computing as well as evaluating and consulting on general-use software products. Works closely with personnel in the programming development area and users in the many campus administrative offices. Candidate must have a B.S. in Computer Science or related field. Four years of programming plus two years of systems analysis and design background in business data processing applications, COBOL fluency, and good oral and written communication skills are required. Experience with higher education administrative systems and interactive data base management systems is a plus. Salary range is $21,336 to $32,004, commensurate with experience, with the successful candidate most likely to receive a salary not to exceed the midpoint of $26,676.

*This position offers a full University benefit package. Location is in Laramie, a pleasant city with a population of 25,000 in the Rocky Mountain area and home of the University, which serves 10,000 full-time students in all disciplines.*

*Qualified candidates should forward their resumes, current salary, and three references with telephone numbers to: Anne Roth, Division of Computer Services, PO Box 3945, University Station, Laramie, WY 82071.*

*The University is an Equal Opportunity/Affirmative Action Employer*

# DYNAMAC CORPORATION

**INFORMATION AND MANAGEMENT SYSTEMS DIVISION**

**IMMEDIATE OPENINGS - $50K**

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  Development – Design – Implementation
- **DATA BASE ADMINISTRATORS**
  Development – Design – Implementation
- **HARDWARE/SOFTWARE SPECIALISTS**
  Technical Support Univac 1100 – Tandem 16 Problem Resolution
- **COMPUTER SPECIALISTS**
  Structured Analysis – Structured Design
- **PROGRAMMERS-COBOL**
  Implementation – Maintenance

**Positions are located in Lexington Park, Maryland (90 miles southeast of Washington, D.C.) on the shores of the Chesapeake Bay**

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**(301) 468-2500 X330**

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**PAX Project**
**DYNAMAC CORPORATION**
**11140 Rockville Pike**
**Rockville, MD 20852**

## VICE PRESIDENT MARKETING

Serious, professional start up, to be heavily financed, in high growth software market, looking for senior marketeer with 15+ years experience in computer industry. Will receive significant equity. Responsible for strategy, advertising-/promo, support, and training. Reply to: Back Bay Postal Annex, P.O. Box 1453, Boston, MA 02117.

## TECHNICAL SPECIALIST/MANAGER
**• Los Angeles •**

Dataserv Computer Maintenance, Inc. has an immediate opening for a person with experience with IBM 3600 Supermarket Systems. Duties will include start-up of large scale maintenance operation in the Los angeles area. Successful candidate will be promoted to full-time management position at next expansion phase.

## FIELD ENGINEER/TECHNICAL SPECIALIST
**• Los Angeles •**

Dataserv Computer Maintenance, Inc. has an immediate opening for a person with experience with IBM 3600 Supermarket Systems. Duties will include start-up and support of a large scale maintenance operation in the Los Angeles area. Successful candidate will be promoted to full-time technical support at next expansion phase.

## TECHNICAL SPECIALIST
**• Minneapolis - St. Paul •**

Dataserv Computer Maintenance, Inc. has an immediate opening for a person with experience with IBM Series 1 computers. Candidate will provide support for a large-scale Series 1 user on a national basis. Some travel will be required.

Dataserv is a rapidly growing company. We are international in our operations and want individuals to apply who have the qualifications we need. Send resumes to Bev Bovee or call, toll-free, 800-328-6729 to arrange for an appointment to interview.

**dataserv**
**COMPUTER MAINTENANCE, INC.**
**509 SECOND AVENUE SOUTH**
**P.O. BOX 3003**
**HOPKINS, MN 55343**

**EQUAL OPPORTUNITY EMPLOYER**

## OPERATIONS MANAGER

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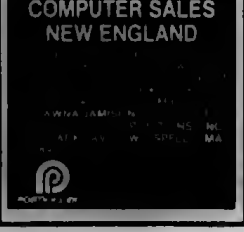

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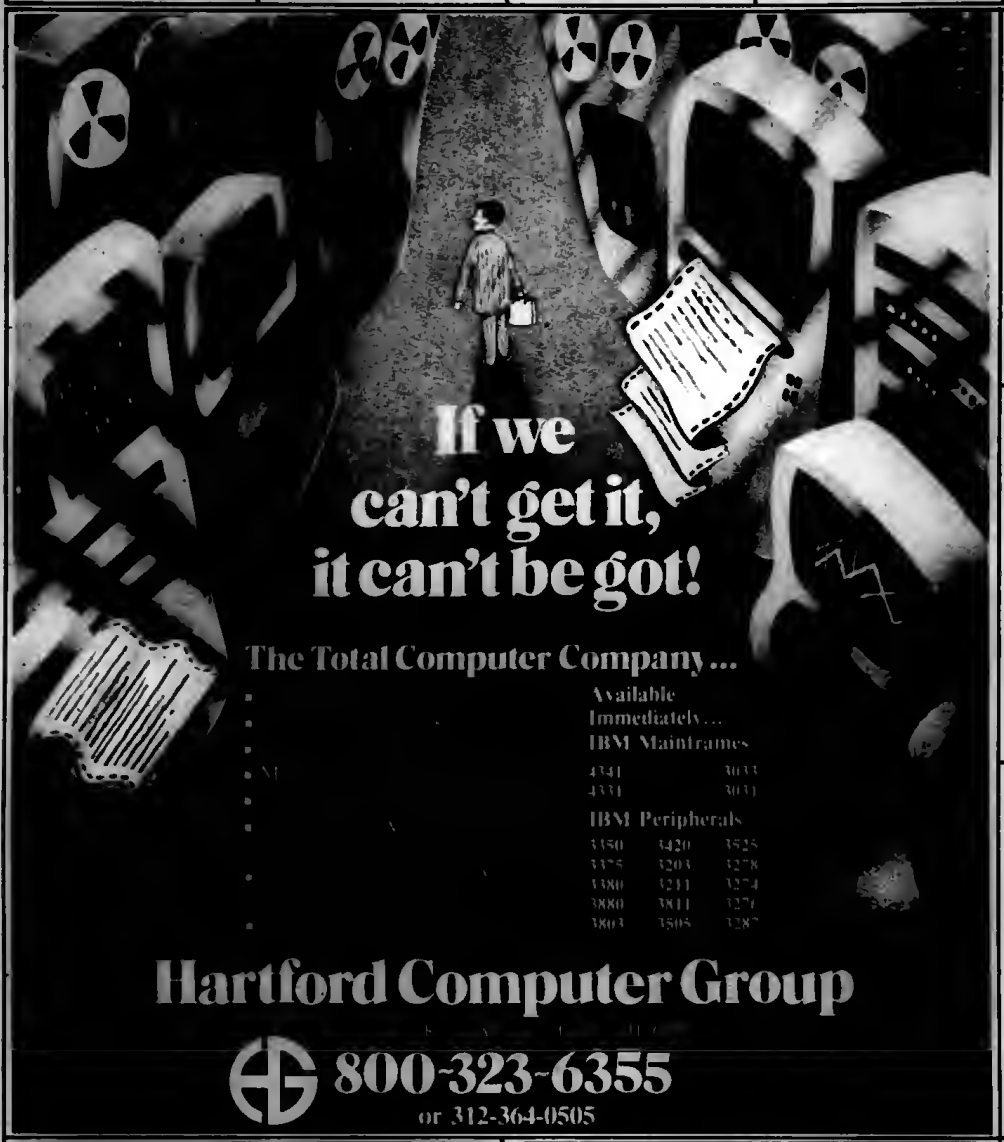


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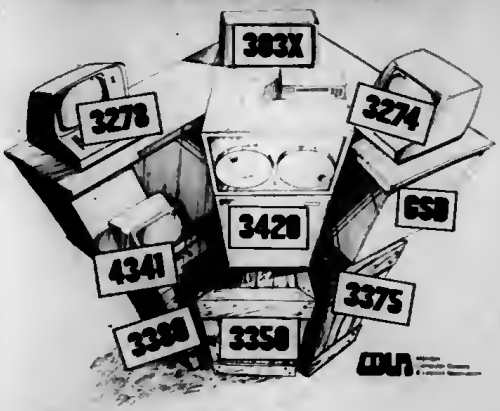


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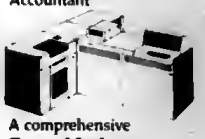

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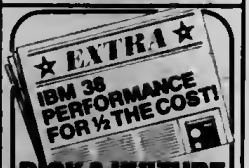


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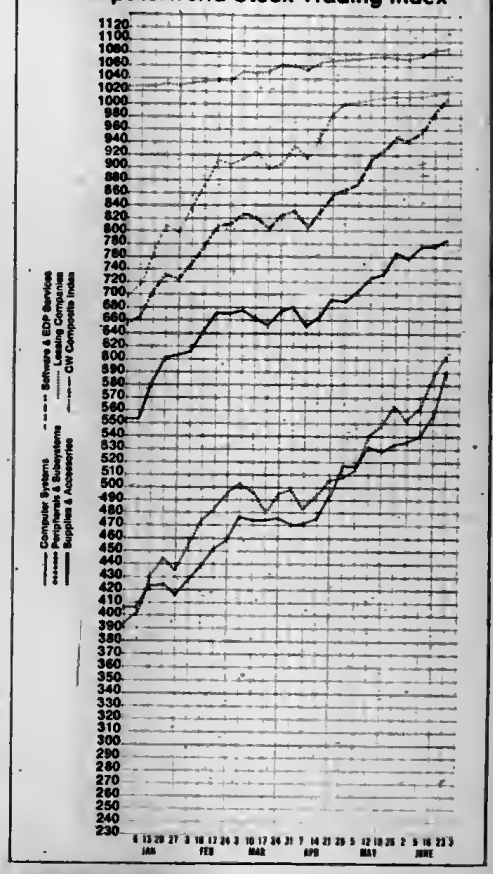


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## Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, JUNE 22, 1983

All statistics compiled, compiled and formatted by TRADE QUOTES INC Cambridge Mass. 02139

| | | 1982-83 RANGE (1) | CLOSE JUN 22 1983 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | COMPUTER SYSTEMS | | | | |
| A | AMDAHL CORP | 8- 30 | 27 1/8 | -1 0/8 | -3.8 |
| N | BURROUGHS CORP | 28- 57 | 57 | + 1/8 | +0.2 |
| O | COMPUTER AUTOMATION | 7- 17 | 15 1/4 | +1 1/8 | +7.8 |
| A | COMPUTER CONSOLES | 15- 47 | 45 0/8 | + 5/8 | +1.3 |
| N | CONTROL DATA CORP | 21- 62 | 58 1/8 | -3 1/4 | -5.2 |
| N | CRAY RESEARCH INC | 20- 46 | 46 1/4 | +1 1/2 | +3.2 |
| N | GRTA GENERAL CORP | 20- 72 | 68 7/8 | +3 7/8 | +5.9 |
| N | GRTAPOINT CORP | 11- 36 | 21 7/8 | +2 1/4 | +11.4 |
| O | DIGITAL EQUIPMENT | 82-132 | 121 1/4 | +7 1/2 | +6.5 |
| A | EECO INC | 8- 15 | 14 1/4 | - 1/2 | -3.3 |
| O | ELECTRONIC ASSOC. | 8- 15 | 14 | + 1/8 | +0.7 |
| N | FLOATING POINT SYST | 18- 46 | 41 7/8 | -2 1/8 | -4.8 |
| O | FOXBORO | 22- 47 | 42 1/4 | + 3/8 | +0.8 |
| O | FULCRUM CORP DRP | 1- 3 | 1/4 | 0 | 0.0 |
| O | GENERAL AUTOMATION | 3- 23 | 18 1/8 | - 1/8 | -0.8 |
| N | HARRIS CORP | 20- 91 | 42 3/8 | - 7/8 | -2.0 |
| N | HEWLETT-PACKARD CO | 36- 98 | 82 1/4 | -2 | -2.1 |
| O | HONEYWELL INC | 80-124 | 118 1/4 | - 1/4 | -0.2 |
| O | IBM | 97-126 | 123 1/8 | +2 1/2 | +2.0 |
| O | IPL SYSTEMS INC | 6- 14 | 12 3/4 | -1 1/4 | -8.8 |
| O | MAGNUSON CORP SYSTS | 2- 8 | 8 | 0 | 0.0 |
| O | MANAGEMENT ASSIST | 7- 18 | 14 3/8 | - 1/2 | -3.3 |
| TO | MIAI-COMPUTER SYST | 1- 2 | 2 | - 1/8 | -3.8 |
| O | MODULAR COMPUTER SYS | 5- 10 | 10 7/8 | 0 | 0.0 |
| O | NDMARK DATA NCI | 10- 19 | 19 3/8 | +1 1/4 | +6.8 |
| O | NCR | 38-123 | 121 1/2 | -2 3/4 | -2.2 |
| O | PERRIN-ELMER | 17- 33 | 33 | +1 3/4 | +5.6 |
| O | PRIME COMPUTER INC | 11- 30 | 30 1/8 | +1 3/8 | +7.8 |
| O | SPERRY CORP | 21- 38 | 38 7/8 | - 1/2 | -1.3 |
| O | TANDEM COMPUTERS INC | 14- 36 | 32 | + 1/2 | +1.3 |
| N | TEXAS INSTRUMENTS | 7-175 | 116 | +3 | +2.9 |
| A | WANG LABS "B" | 15- 42 | 40 3/8 | +2 1/8 | +5.6 |
| O | WANG LABS "C" | 15- 42 | 36 3/4 | -1 | -2.8 |
| | LEASING COMPANIES | | | | |
| O | BOOTHE FINANCIAL CP | 33- 38 | 32 | +8 | +10.8 |
| O | COMPUTECO INC | 7- 37 | 97 1/4 | + 3/4 | +2.0 |
| O | COMMERCE GROUP CORP | 1- 1 | 1/4 | 0 | 0.0 |
| O | COMPUTER INVSTRS GRP | 1- 2 | 1/8 | 0 | 0.0 |
| O | CONTINENTAL INFO SYS | 9- 26 | 26 3/4 | +3 1/2 | +13.3 |
| O | DPF INC | 9- 14 | 13 1/4 | - 7/8 | -6.1 |
| O | ITEL | 1- 9 | 1 1/8 | 0 | 0.0 |
| O | LEASPAC CORP | 1- 2 | 1/8 | 0 | 0.0 |
| O | U.S. LEASING | 10- 47 | 42 | + 0/8 | +0.0 |

EXCH: O=NEW YORK; A=AMERICAN; P=PACIFIC; O=BOSTON; N=NATIONAL; O=MIDWEST; O=OVER-THE-COUNTER
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| | | 1982-83 RANGE (1) | CLOSE JUN 22 1983 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| | SOFTWARE & EDP SERVICES | | | | |
| O | ADVANCED COMP TECH | 1- 7 | 6 | + 3/4 | +4.3 |
| O | ADVANCED SYSTEMS INC | 8-30 | 25 1/2 | +1 1/4 | +4.4 |
| O | AGS COMPUTERS INC | 7- 30 | 30 3/4 | + 1/4 | +0.8 |
| O | AMERICAN SOFTWARE | 22- 31 | 30 3/4 | +6 1/2 | +21.7 |
| O | ANACOMP INC | 5- 33 | 18 7/8 | - 3/8 | -2.1 |
| O | ANALYSTS INTL CORP | 5- 30 | 19 1/2 | +3 1/4 | +20.0 |
| O | APPLIED DATA RES. | 8- 27 | 25 1/4 | -2 | -7.3 |
| O | ASK COMPUTER SYSTEMS | 12- 26 | 26 1/4 | 0 | 0.0 |
| O | AUTOMATIC DATA PROC | 21- 44 | 43 5/8 | +1 7/8 | +4.4 |
| A | CDA COMPUTER ASSOC | 8- 15 | 14 1/4 | + 1/4 | +1.8 |
| O | COMPUTER ASSOC INT'L | 8- 33 | 32 1/2 | +3 3/4 | +13.0 |
| O | COMPUTER HORIZONS | 8- 30 | 29 3/4 | +2 3/4 | +10.1 |
| O | COMPUTER NETWORK | 4- 10 | 8 1/8 | -1 | -8.8 |
| O | COMPUTER SCIENCES | 19- 33 | 30 3/8 | +1 1/8 | +3.7 |
| O | COMPUTER TASK GROUP | 8- 33 | 18 1/4 | + 1/4 | +1.4 |
| O | COMPUTER USAGE | 2- 22 | 20 1/4 | +1 1/4 | +6.6 |
| O | COMPUTONE SYSTEMS | 18- 36 | 33 | - 1/2 | -2.2 |
| O | CONSERV CORP | 10- 20 | 14 1/4 | - 3/4 | -5.0 |
| O | CONSHARE | 8- 19 | 18 | 0 | 0.0 |
| O | CULLINET SOFTWARE | 18- 38 | 44 | -2 3/4 | -5.9 |
| O | CYCARE SYSTEMS INC | 8- 27 | 33 | -1 1/2 | -4.1 |
| O | DATA DIMENSIONS INC | 1- 9 | 3/4 | 0 | 0.0 |
| O | DATATAB | 0- 0 | 1 | + 1/8 | +33.3 |
| O | DYATRON CORP | 2- 4 | 3 3/8 | 0 | 0.0 |
| O | ELECTRONIC DATA SYST | 10- 42 | 40 | - 1/4 | -0.6 |
| O | INFORMATICS INC | 18- 36 | 36 3/8 | +2 1/2 | +8.8 |
| O | INNOVE CORP | 1- 2 | 1 3/8 | - 1/8 | -8.9 |
| O | IPS COMPUTER MARKET. | 1- 2 | 1 1/8 | 0 | 0.0 |
| O | KAASS ASSOCIATES | 4- 10 | 10 1/2 | + 1/4 | +2.4 |
| O | LOGICON | 12- 44 | 40 3/4 | - 3/8 | -0.9 |
| O | MART NCI AMER INC | 8- 33 | 33 1/8 | +2 | +6.3 |
| O | MATHEMATICA INC | 12- 28 | 28 | +1 3/8 | +5.1 |
| O | MATHEMATICAL APP GRP | 12- 30 | 18 | - 1/2 | -3.0 |
| O | NATIONAL DATA CORP | 8- 33 | 33 5/8 | +1 0/8 | +3.8 |
| O | PANSOPHIC SYSTEMS | 8- 30 | 30 1/4 | +2 | +7.0 |
| O | PLANNING RESEARCH | 8- 21 | 21 1/8 | 0 | 0.0 |
| O | POLICY MGMT SYSTS CP | 35- 68 | 62 1/4 | -3 1/8 | -4.8 |
| O | PROGRAMMING & SYS | 1- 6 | 6 | +1 | +20.0 |
| O | REYNOLDS & REYNOLDS | 17- 46 | 43 0/4 | +2 3/4 | +5.8 |
| O | REI CORP | 11- 28 | 28 1/2 | 0 | 0.0 |
| O | SHARED MEDICAL SYST | 13- 43 | 46 1/4 | +1 1/4 | +2.8 |
| O | SCIENTIFIC COMPUTERS | 8- 14 | 13 | + 3/8 | +2.9 |
| O | SOFTWARE AG | 8- 17 | 11 | + 1/2 | +4.3 |
| O | TYMSHARE INC | 12- 30 | 21 | -1 | -4.5 |
| O | URS CORP | 9- 18 | 17 | + 1/4 | +1.8 |
| O | WYLY CORP | 7- 17 | 13 | -3 7/8 | -11.1 |
| | PERIPHERALS & SUBSYSTEMS | | | | |
| O | AM INTERNATIONAL | 2- 7 | 6 7/8 | 0 | 0.0 |
| O | ANDERSON JACOBSON | 8- 26 | 24 3/4 | -1 | -3.8 |
| O | AUTO-TROL TECHNOLOGY | 8- 36 | 36 1/4 | - 1/4 | -1.8 |
| O | BANCTEC INC | 7- 33 | 18 1/2 | +1 3/4 | +11.8 |
| O | BEEHIVE INT'L | 4- 10 | 12 1/2 | + 3/4 | +9.2 |
| O | BOLT-BERANEK & NEW | 12- 75 | 76 | +3 1/2 | +4.8 |
| O | CANRAD CORP | 2- 4 | 2 3/8 | 0 | 0.0 |
| O | CENTRONICS DATA CORP | 8- 28 | 28 1/8 | +1 1/4 | +4.6 |
| O | CETEC CORP | 6- 12 | 11 | + 1/8 | +1.1 |
| O | COMMTRONICS | 2- 30 | 30 | +8 1/8 | +37.8 |
| O | COMPUTER CORPUS. | 1- 3 | 1 3/4 | 0 | 0.0 |

| | | 1982-83 RANGE (1) | CLOSE JUN 22 1983 | WEEK NET CHNGE | WEEK PCT CHNGE |
|---|---|---|---|---|---|
| O | COMPUTER DEVICES INC | 4- 21 | 14 3/8 | -1 1/4 | -8.0 |
| O | COMPUTER TRANSCEIVER | 4- 12 | 8 3/4 | 0 | 0.0 |
| O | COMPUTERVISION CORP | 18- 53 | 48 1/2 | -3 3/8 | -6.5 |
| O | CONRAC CORP | 17- 36 | 23 | +3 3/4 | +18.4 |
| A | DATA ACCESS SYSTEMS | 1- 3 | 0/4 | + 1/8 | +28.0 |
| A | DATAPRODUCTS CORP | 18- 41 | 39 3/4 | - 3/4 | -2.4 |
| A | GRTAMAN CORP | 5- 12 | 10 3/8 | - 1/8 | -1.1 |
| O | GRTUM INC | 2- 17 | 14 3/4 | +1 3/4 | +10.8 |
| O | DAVID JARRISON CARLYL | 3- 7 | 3 3/4 | + 1/8 | +7.1 |
| O | DECISION DATA COMPUT | 3- 16 | 12 7/8 | -2 | -13.0 |
| O | DELTA DATA SYSTEMS | 1- 4 | 0 1/2 | 0 | 0.0 |
| N | ELECTRONIC M & M | 9- 11 | 10 0/8 | 0 0/8 | -3.8 |
| O | EVANS & SUTHERLAND | 18- 50 | 45 1/2 | - 1/4 | -0.5 |
| O | GANDALF TECHNOLOGIES | 10- 22 | 11 3/8 | - 1/2 | -4.2 |
| A | GEN'L DATA COMM IND | 8- 39 | 27 1/4 | +4 0/8 | +18.1 |
| O | GENERAL TERMINAL CP | 1- 2 | 3/4 | 0 | 0.0 |
| O | GREAT SOUTHWEST IND | 0- 6 | 2 1/2 | 0 | 0.0 |
| O | HAZELTINE CORP | 7- 31 | 30 1/2 | +1 1/8 | +3.8 |
| O | ICOT CORP | 3- 10 | 7 7/8 | - 1/4 | -3.8 |
| O | INFORMATION INTL INC | 10- 22 | 17 3/4 | 0 | 0.0 |
| O | INTEL CORP | 21- 78 | 76 1/4 | +18 | +26.9 |
| O | IPL SYSTEMS INC | 5- 14 | 12 3/4 | -1 1/4 | -8.8 |
| A | LUNDY ELECTRONICS | 7- 18 | 17 7/8 | 0 | 0.0 |
| A | MSI DATA CORP | 14- 36 | 32 1/2 | -2 3/8 | -6.8 |
| O | MATHEMA SYSTEMS CORP | 8- 34 | 32 7/8 | +3 3/8 | +10.8 |
| O | OMEN | 3- 6 | 3 1/2 | 0 | 0.0 |
| O | PARADYNE CORP | 20- 38 | 33 1/2 | +3 1/4 | +10.8 |
| O | PERMIL CORP | 7- 18 | 13 3/8 | +1 3/8 | +11.6 |
| O | RARTER CORP | 12- 36 | 18 1/2 | + 1/2 | +2.8 |
| E | RECOGNITION EQUIP | 4- 17 | 14 | - 1/2 | -3.4 |
| O | SCAN DATA | 1- 0 | 1 1/8 | 0 | 0.0 |
| O | STORAGE TECHNOLOGY | 18- 33 | 33 3/4 | + 3/8 | +1.8 |
| O | SYKES DATATRONICS | 8- 27 | 12 | + 3/8 | +3.2 |
| O | T BAR INC | 7- 18 | 15 3/4 | +1 1/8 | +7.8 |
| O | TEC PRODUCTS CO | 8- 25 | 23 3/4 | +1 5/8 | +7.3 |
| O | TEC INC | 8- 12 | 8 3/4 | + 3/8 | +4.5 |
| E | TEKTRONIX INC | 24- 88 | 48 1/4 | +3 1/2 | +4.2 |
| O | TELEX | 5- 31 | 26 | +3 3/4 | +14.2 |
| O | TESDATA SYSTEMS CP | 3- 14 | 12 7/8 | - 5/8 | -4.6 |
| O | TIMEPLEX INC | 7- 30 | 28 | 0 | 0.0 |
| O | VISUAL TECHNOLOGY | 8- 26 | 23 1/8 | - 1/2 | -2.1 |
| O | WILTEK INC | 1- 4 | 2 1/4 | + 1/8 | +5.6 |
| | SUPPLIES & ACCESSORIES | | | | |
| N | AMERICAN BUS FORMS | 11- 30 | 30 | +1 3/4 | +5.8 |
| O | BALTIMORE BUS FORMS | 1- 2 | 0/4 | 0 | 0.0 |
| O | BARRY BRIGHT | 13- 31 | 30 | - 3/4 | -2.4 |
| O | CYBERNETICS INC | 1- 2 | 2 | + 3/4 | +60.4 |
| O | DUPLER PRODUCTS INC | 12- 36 | 35 | - 1/8 | -0.3 |
| O | ENNIS BUS. FORMS | 10- 48 | 47 1/4 | +3 3/4 | +8.6 |
| O | 3M COMPANY | 80- 98 | 98 1/2 | -2 7/8 | -2.8 |
| O | MOORE CORP LTD | 85- 91 | 88 | + 3/4 | +1.3 |
| O | NASHUA CORP | 9- 22 | 18 1/2 | -3 1/8 | -8.8 |
| O | STANDARD REGISTER | 11- 36 | 33 | 0 | 0.0 |
| O | WALLACE BUS FORMS | 11- 30 | 27 7/8 | +1 7/8 | +7.2 |

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This kind of computing saves time for both you and the executive. A case in point: sales projections. Typically, your department has to come up with current data from the mainframe. Then the executive spends hours doing his own calculations.

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| MSA online mainframe software | MSA Executive Peachpak™ software for microcomputers |
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| General Ledger | PeachCalc™—electronic spreadsheet |
| Payroll | Business Graphics—full color system |
| Personnel Management and Reporting | Telecommunications—links other databases |
| Accounts Payable | PeachText™—customized reporting |
| Accounts Receivable | Spelling Proofreader, Random House Dictionary and Thesaurus |
| Forecasting & Modeling | List Manager—personal database |
| Fixed Assets Accounting | PeachLink™—link to mainframe |
| Capital Expenditure Tracking | From Peachtree Software, a wholly owned subsidiary of MSA |
| Inventory & Purchasing | |
| Foreign Exchange | |
| Manufacturing Systems (MRP II) | |

PeachLink™ software links personal computers to all these MSA mainframe systems